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THE LANCET

Offices : 7, ADAM STREET, ADELPHI, W.C.2.

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No. I., OF VOL. I., 1939. LONDON, SATURDAY, JANUARY 7, 1939. Pp. 168—Price 1s.
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No. 6019 LONDON: SATURDAY, JANUARY 7, 1939 CCXXXVI

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ADDRESSES AND ORIGINAL ARTICLES

RECURRENT PEPTIC ULCERATION

CAUSES OF AND DESIGN FOR THE SECOND OPERATION ON THE STOMACH *

BY R. E. KELLY, C.B., M.D. Lpool, F.R.C.S.

SENIOR HON. SURGEON, LIVERPOOL ROYAL INFIRMARY, AND PROFESSOR OF SURGERY IN LIVERPOOL UNIVERSITY

AMONG the posthumous papers of John Hunter, the famous Essays and Observations, arranged and revised by Richard Owen, there occur these words:—

"If one could conceive a man to put his hand into the stomach of a lion and hold it there without hindering the digestive powers, the hand would not in the least be digested; and if the hand of a dead man was put in at the same time, whether separated or not from the body, that hand would be digested, while the other would not." And in a footnote:—

"The *Hydra viridis* occasionally performs such an experiment for us, swallowing one of its own arms along with its prey; but, while this is dissolved, the living part of itself is disgorged uninjured and resumes its functions."

These observations by the great founder of our museum show that even as early as 1772 the problem of the stomach digesting itself had occupied his fertile mind.

The fact that the stomach does digest itself and produce peptic ulceration obtrudes itself so much on a surgeon's mind that he cannot but be interested in the innumerable theories which have been advanced for its causation. Whether he inclines to the pure peptic theory that gastric juice first kills and then digests itself, whether he feels that the vascular or nervous system plays the principal rôle in formation of the ulcer, whether he thinks that the primary condition is simply one of inflammation, or whether, like Brummelkamp of Amsterdam, he believes that starvation alone may cause ulceration even of the stomach itself, the surgeon has to deal with the sequelæ and complications of peptic ulceration.

There are no more vexatious happenings to both a surgeon and his patient than to have to reopen the abdomen a second time. But failures are always so much more interesting than successes. Like misfortunes, we bear each others' failures with equanimity, but our best experience is a consideration of our own failures, and the lessons so learnt are the more salutary. With this end in view I thought I might interest you in a consideration of the reasons for, and the methods used in, the second operation on the stomach. The lessons may help us in the understanding of gastric and jejunal ulcers and the growth of stomach tumours.

The whole field is a wide one, and I propose to restrict it to the problems of the second or third perforation, the onset of a jejunal ulcer, the immediate and remote dangers of a gastro-enterostomy, and the problem of the gastro-colic fistula. I do not propose to say anything of carcinoma. This paper is a record of my own personal experience of repeated stomach operations in the last thirty years. In very few instances have I done the primary operation myself. But that experience is general. Patients like a change of surgeon.

TWO PHYSIOLOGICAL EXPERIMENTS

In the first place I would remind you of two physiological experiments which are of great importance. The first is that of a gastro-enterostomy in a dog with a patent pylorus. The dog is given a small ball of string wrapped up in a bolus of meat which it will bolt without chewing. If the end of the string is so fastened that it cannot be wholly swallowed, then the ball of string will be pushed through the pylorus, enter the stomach again by the gastro-enterostomy opening, again be pushed through the pylorus and loop-the-loop until the whole string is unravelled (fig. 1). The whole mechanism of the muscles of the stomach serves to propel the stomach contents the right way despite the easier path directly into the intestine.

Unless, therefore, the pylorus is stenosed, we have no guarantee that food will always leave the stomach by the new opening. This physiological mechanism was brought most vividly to my mind in the case of a young man with a duodenal perforation in which I was able to close the hole within a few hours of perforation. At the time I thought I had so stenosed the pylorus with my stitches that I also did a gastro-enterostomy. Some weeks after the operation he had persistent vomiting accompanied by tetany. Lavage of the stomach did not relieve him, and I had to reopen the abdomen. I found the whole of the duodenum dilated and the pylorus normal in size. In this case I thought there was a mechanical failure due to a twist of the afferent loop, so I merely undid the gastro-enterostomy. He had no further symptoms for a year or two afterwards. A somewhat similar accident has occurred with me when the proximal afferent loop has invaginated itself into the stomach lumen and blocked the efferent loop (fig. 2).

The second experiment is that of Mann and is called by him duodenal drainage (fig. 3). The pylorus and jejunum are both completely cut across. The duodenum is closed completely. The distal jejunum is attached to the stomach and the proximal jejunum anastomosed with the small bowel at various distances from the duodenal-jejunal junction. The lower the second anastomosis the greater the risk of peptic ulceration. High up the ulcer-rate is 50 per cent., whereas an anastomosis at the lower end of the ileum bears an ulcer-rate of nearly 100 per cent. of cases. The further away from the neutralisation of the bile, pancreatic, and duodenal juices, the greater the liability to ulceration. Experimentally, by excluding the bile alone, the pancreatic juice alone, or both, it has been proved that bile has the greatest, pancreatic juice the next, and succus entericus the least neutralising effect.

JEJUNAL ULCERATION

We may look on jejunal ulceration as either the direct effect of the acid or pepsin of the gastric juice in the wrong place, or as a failure of the fresh combined duodenal juices to lave the new stoma—a failure of neutralisation rather than of too great an acidity. It follows that those operations which have been devised to prevent the reflux of bile into the stomach may be physiologically wrong.

The entero-anastomosis between the loops of gastro-enterostomy and the Roux's operation in Y, as well as the gastrectomy in Y, all have the disadvantage of diverting the alkaline juices from the stoma (fig. 4). I believe that Roux's operation in Y and those in which the afferent and efferent loops are anastomosed incur the liability of ulceration in that part of the bowel which lacks the bile influx.

* Bradshaw lecture for 1938 delivered before the Royal College of Surgeons on Dec. 2.

This is well exemplified in a man, aged 44, who had had a duodenal ulcer and a gastro-enterostomy. Later on he developed two ulcers on the stoma—one at each end—and a gastrectomy was performed. At this operation a surgeon anastomosed both loops of the jejunum distal to the gastrectomy opening because he thought the drainage would be better. An ulcer recurred in the jejunum between the two anastomotic openings and was the cause of his symptoms.

What then are we going to do with these persistent ulcerations and persistent perforations? The questions that arise are five:—

(1) What are the risks of a jejunal ulcer when a posterior gastro-enterostomy is done?

(2) Should a posterior gastro-enterostomy be done in every case that perforates a second time?

(3) When should a posterior gastro-enterostomy simply be undone?

(4) If anything further *is* done, what are the relative merits of (*a*) gastro-duodenostomy and (*b*) gastrectomy?

(5) What procedure holds out the best prognosis if a gastro-colic fistula develops?

Before attempting to answer all these questions I would like to say what a variable period of time may elapse between the gastro-enterostomy and the onset of the jejunal ulceration. As a rule it is within a year or so, but I have a record of a man who for sixteen years was quite well after a posterior gastro-enterostomy and then developed a jejunal ulcer in the afferent loop. For eight years subsequently he had repeated attacks of pain on the left side, and eventually he was operated on for the second time *twenty-four* years after the original posterior gastro-enterostomy. The ulcer was on the mesenteric border of the jejunum. In another case I operated twenty-six years after the posterior gastro-enterostomy. On the other hand, ulcers have developed within two to three weeks after a posterior gastro-enterostomy.

Light, Bishop, and Kendall[1] (Harvey Cushing's pupils) produced gastric lesions in rabbits by injecting pilocarpine into the lateral ventricles of the brain or the cisterna magna. The rabbits were killed after 2–3 hours, and lesions varying from simple petechial hæmorrhages to small ulcers under 3 mm. in diameter were found. The first change is a local anæmia followed by rupture of minute surface capillaries. The occurrence of contracted vessels is definite. The devitalised tissue soon falls a prey to the gastric juice. The interest to me lies in the fact that definite small ulcers with complete destruction of the mucous membrane can occur experimentally as early as two and a half hours after the administration of the drug.

Brummelkamp has recently shown that in rats typical gastric ulcers can be produced by pure starvation. Even if there were two fast days and two feed days alternately, so that the animals did not lose flesh, ulcers were produced. In rabbits a similar result could be obtained with the addition of morphia, but the experiments failed with the cat unless morphia was combined with injections of histamine. The cat in its wild state, like other felines, does not get his meals regularly. In all cases free hydrochloric acid was found in the stomach post mortem. The lesions could be prevented by the administration of Alocol (colloidal aluminium hydroxide). It is interesting to note that in the rat experiments the lesions were in the ante-stomach and in rabbits and cats in the pylorus, both parts of the stomach which secrete no acid.

The other point is the chronicity of some of the abscesses found in association with perforations. I have opened a sub-diaphragmatic abscess, caused by a leak from a gastrectomy, eight months after the operation and I have seen a slow perforation produce a silent abscess which crept up both sides of the gall-bladder and caused a finger-point tenderness on the fundus of the gall-bladder. This was mistaken for acute cholecystitis, a mistake confirmed by a positive Graham's test.

These cases are in striking contrast to the usual fulminating peritoneal crises constantly associated with leaks in the front wall of the stomach or duodenum. But to return to our questions.

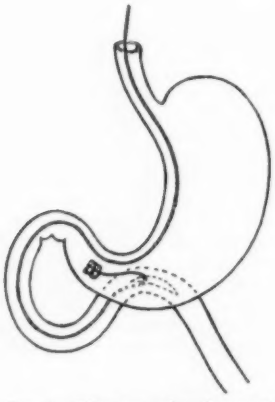

FIG. 1—Diagram showing route taken by bolus in gastro-enterostomy with patent pylorus in a dog.

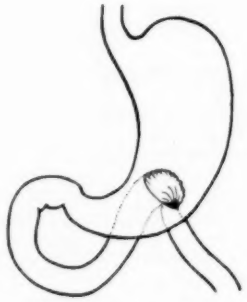

FIG. 2—Diagram showing accidental invagination of proximal afferent loop into lumen of stomach and blocking of efferent loop of gastro-enterostomy.

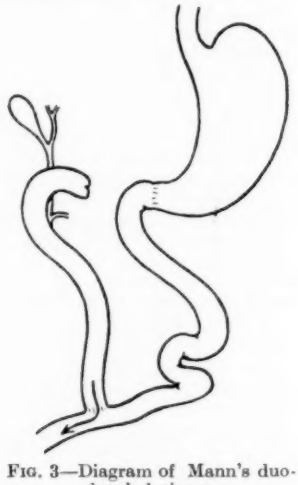

FIG. 3—Diagram of Mann's duodenal drainage.

SECOND OPERATION

Is it advisable always to do a posterior gastro-enterostomy after a second perforation? I think not. Patients do fairly well with simple suture. The stenosis caused by stitches always looks greater than

[1] Light, R. U., Bishop, C. C., and Kendall, L. G., *J. Pharmacol.* 1932, **45**, 227.

it really is, and cases with a second *duodenal* perforation are those most likely to be followed by jejunal ulceration, should a posterior gastro-enterostomy be done at the time or later on.

If jejunal ulceration follows a posterior gastro-enterostomy, should the anastomosis simply be

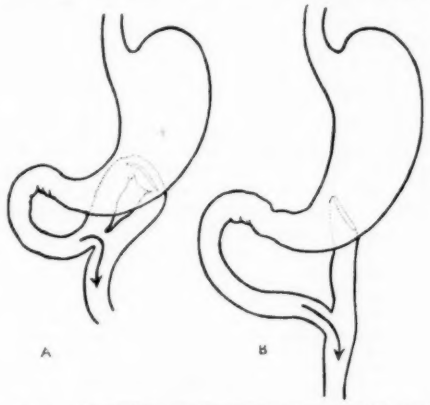

FIG. 4—A, Posterior gastro-enterostomy with entero-anastomosis. B, Roux's posterior gastro-enterostomy in Y.

undone or should this be combined with a Finney's operation, a gastro-duodenostomy? Many surgeons I know favour the latter operation. Kocher's gastro-duodenostomy and Finney's operation are both difficult operations. It is not easy always to mobilise the duodenum sufficiently to perform a long enough anastomosis. Duodenal sutures are liable to cut out, and gastro-duodenostomy does not always prevent further ulceration.

Some years ago I operated on a man who had had a duodenal perforation sutured—then a posterior gastro-enterostomy—and then an undoing of the posterior gastro-enterostomy and a gastro-duodenostomy. I saw him three days after an acute abdominal crisis. He had a very large duodenal perforation opposite the new gastro-duodenostomy opening. Whether this was a recurrence of the original ulcer I could not tell, for I had done none of the previous operations, but the fact remains that the gastro-duodenostomy, which after all is the more physiological operation, failed in this case to prevent further ulceration and the perforation from which he died. Here is a picture of a recurrent ulceration after many operations:—

A man, aged 43, had had four previous operations: the first appendicectomy and the three others on the stomach, the last being a simple undoing of a posterior gastro-enterostomy for jejunal ulceration. His duodenal ulcer was still active and painful. My operation, the *fifth*, was to do a Polya's partial gastrectomy. This entailed a long and tedious dissection to free the omentum, stomach, liver, and jejunum from adhesions. Within two months the man developed another jejunal ulcer, which perforated with dramatic suddenness within a few days of writing to me to say how easy his digestion was.

Can pathologists help us in these distressing complications?

Prof. M. J. Stewart kindly examined the excised portion of this stomach and reported as follows:—

There is a striking contrast between the fundal type and lesser curvature type mucous membrane in the matter of chronic gastritis. In the former the deeper part of the mucosa is broad and full of well-stained oxyntic cells, and it shows little or no evidence of chronic inflammatory change. The surface zone shows considerable capillary engorgement and œdema with a slight degree of infiltration mainly by plasma cells. The submucosa of this (greater curvature) region shows considerable œdema, which is, I think, the main cause of the thickened folds.

The mucosa of the lesser curvature region, on the other hand, shows a very notable chronic gastritis with much infiltration by plasma cells (also many eosinophil cells and lymphocytes), numerous lymphoid follicles with active germ centres, and hyperplasia of the muscularis mucosæ with prolongations upwards between the glands. The submucosa is intensely engorged, with hæmorrhage here and there, and occasionally the capillary channels show stuffing or pavementation with leucocytes. A remarkable feature is almost complete absence of intestinal heterotopia; there is only the merest trace of it here and there. Possibly this is a feature of duodenal ulcer cases, but I have very little clinical material bearing on this point.

In the site of the old gastro-jejunostomy scar there is a hernia of mucous membrane into the thickness of the muscular coat and in fact almost through it. Opposite the tip of the hernial pouch the remains of the thinned muscular coat show notable polymorphonuclear reaction, both intra- and peri-vascular. This corresponds to the chief area of adhesion on the surface of the stomach. In the midst of these adhesions, close to the muscular coat, I see some small pieces of foreign material, ? suture relics, with foreign-body giant cells in their neighbourhood.

In the region of the old stoma also I note considerable inflammatory reaction deep in the muscular coat, including polymorphonuclear reaction in and around small blood-vessels.

Summary.—(1) Chronic gastritis of lesser curvature type mucosa. (2) Slight superficial gastritis only of fundal type mucosa; oxyntic cells very abundant. (3) Œdema and congestion of submucosa. (4) Mucosal hernia into old healed gastro-jejunal scar.

Regarding *heterotopias* Prof. Stewart also states:

(1) In a large proportion of cases of chronic gastric ulcer of the stomach areas of intestinal-type mucous membrane can be demonstrated replacing a corresponding area of gastric mucosa. These are characterised by intestinal-type goblet-cells and Paneth cells, and the whole structure is perfectly typical. Such islets are usually sharply defined at the margin; there is no transition, typical gastric and typical intestinal mucosa lying side by side. In some cases the intestinal heterotopia is most extensive, replacing nearly the whole of the mucosa. This change is more or less limited to the pyloric and lesser curvature regions. You do not usually see it in the areas where oxyntic cells are present. (2) There is a second type of heterotopia associated with the healing of chronic ulcers and in their resulting scars. This is in the form of glandular penetration of scar tissue; it is not of intestinal type and is liable to be mistaken by the uninitiated for early carcinoma, which it is not.

Of all methods of gastro-enterostomy it would appear that a gastro-duodenostomy is physiologically the least disturbing. But the results of the operation have not given me satisfaction. For a year or so patients are delighted, but almost invariably they come back with further abdominal pains. On opening the abdomen after a Finney's operation one finds that despite the most careful suturing the whole of the pyloric region is firmly fixed in adhesions; it is attached to the omentum, the gall-bladder, the liver, and often the abdominal wall. I am of opinion that indigestion may often be due to a pull by the stomach movements on the anterior parietal peritoneum. The attachment of the abdominal wall due to further ulceration is sometimes so extensive that the induration may be mistaken for a sarcoma or a desmoid tumour. I have known this diagnosis made after a biopsy of the tumour in the abdominal wall. The

ulcer may even reach the size of two inches in diameter. The induration of a posterior ulcer, too, has been so extensive that a surgeon, at exploration of the abdomen four years previously, had called it a malignant and inoperable carcinoma of the pancreas.

Another interesting point is the fact that really chronic peptic ulcers become fixed structures. They get stuck on to the liver, the pancreas, or the abdominal wall. This fixity must so anchor them that the very fixation subjects them not only to added trauma of food and peristalsis but they must bear the added brunt of swishing gastric juice. It is the upstream side of a bridge pier that wears smooth. It is the fixed ulcer that becomes chronic. Which is cause and which effect? How far does this fixity of the duodenum and the lesser curve determine the site of a peptic ulceration? I suggest that the fixity of a gastro-enterostomy plays some part in the production of an anastomotic ulcer. Should a gastro-duodenostomy be done, I think the anastomosis should be most carefully covered in with omentum to prevent adhesions to all the surrounding structures.

In recurrent ulceration about the stoma of a posterior gastro-enterostomy the ulcer may be seen either in the lips of the stoma itself, actually in the stomach side, or entirely in the jejunum. I think that it is usually at the point which is attached to the efferent loop of the jejunum, but it may often be double, one at each end. I have always done a posterior gastro-enterostomy or a Polya's gastrectomy with the distal jejunum attached to the greater curvature. In this way I feel that the alkaline juice laves the stoma in its whole extent from above downwards. Alkalinisation is more diffuse over the whole stoma than if the small bowel is fixed to the stomach in the opposite way—i.e., isoperistaltically.

Another point is that the ends of the stoma are those two places where stitching is not so neat and perhaps more destructive to tissue.

The great diagnostic feature of jejunal ulceration is pain chiefly felt on the left side of the abdomen, generally in the left hypochondrium, coming on very soon after food is taken, and unaltered by alkalis. The pain is boring or burning and is not relieved, like a simple peptic ulcer, by the taking of food or alkalis. Attention may first be drawn by the sudden onset of hæmorrhage or melæna.

Radiograms are not of great diagnostic help. The ulcers may be small, and the irregularities caused by the posterior gastro-enterostomy make a positive diagnosis difficult.

For the past year or two I have had considerable help from the gastroscope. The stoma with the ulceration may quite easily be seen and the state of the stomach mucous membrane (nearly always a chronic gastritis) made out. Sometimes, too, the intense congestion of the jejunum, an angry brownish-red, is clearly seen. With this instrument a positive diagnosis is possible and certain. It is well to do the gastroscopy before the barium meal, for barium seems to stick to the base of any ulcer quite a long time and may easily obscure the ulcer itself. I have done fourteen cases of jejunal ulcer with three deaths—one, however, dying of pulmonary thrombosis two weeks after operation. Only two of the previous gastro-enterostomies had been done by me.

When the ulceration has progressed until it draws in the transverse colon and eventually perforates it, the symptoms become aggravated.

GASTRO-COLIC FISTULA

The important points in the recognition of a gastro-colic fistula are: (1) the intense diarrhœa on taking food of any kind, (2) the marked loss of weight, and (3) the belching of flatus, a sign sometimes more appreciated by the patient's friends than by himself. Loss of weight and strength, dehydration, and anæmia complete the picture. Rarely may actual fæcal material be seen in the vomit, but contamination by fæces may be recognised by the smell as well as by chemical and bacteriological examination. At operation the colitis is more obvious than the jejunitis. Its intense congestion indicates quite clearly the reason of the distressing diarrhœa.

Radiograms will not, as a rule, show the barium meal entering the large bowel, but a fluid barium enema may be seen sometimes to enter the stomach.

As in the simple jejunal ulcers, the gastroscope will reveal the ulcer and the chronic or acute gastritis, but the actual opening into the colon may not be seen. It is too small and out of range of the vision of the instrument.

The operation which I think at present the best for gastro-colic fistula is a Polya's gastrectomy. The steps of the operation are:—

(1) Careful pre-operative lavage of the stomach.
(2) A tedious division of all adhesions.
(3) A complete undoing of the gastro-enterostomy.
(4) Closure of the colic opening.
(5) Closure of the jejunum. This is done at right angles to the axis of the jejunum.
(6) Temporary closure of the stomach opening.
(7) The completion of the operation by a Polya's gastrectomy either ante- or retro-colica.

On occasions the colon may be so involved that it must be partially excised. This may be left until the new gastro-jejunal anastomosis has been done. If any doubt exists in the mind of the operator after this resection, I find it most useful to do a safety-valve cæcostomy or transverse colostomy by inserting a tube like a Witzel's gastrostomy. I have done this operation for gastro-colic fistula eight times (with two deaths). It is a severe operation, but if the patient survives the result is most satisfactory.

As a rule the convalescence is as easy as after a posterior gastro-enterostomy. Patients rapidly put on weight and gain strength. There is one complication that occurred in one of my cases—the case in which the transverse colon had to be cut completely across and resutured. Within a few days he suffered from acute intestinal obstruction due to an adhesion of a loop of jejunum to the old anastomotic line. Freeing of the loop, however, easily put the matter right. This was kindly done for me by Prof. Paterson Ross.

I want to emphasise the great importance of clean sharp cutting of the adhesions.[2] There is always a plane in any adhesion which is almost avascular. The adhesions must be cut in this zone and not torn by rough dissection. The freeing of all adhesions occupies a long time, perhaps half the time of the whole operation. The second point is the complete freeing of the colon and mesocolon from the stoma, and the last part is the resection or closure of the colonic opening.

ASSOCIATION OF ULCER WITH TUMOUR

Finally, I wish to say a word or two about the association of a gastric ulcer with a gastric tumour. These recurrent leiomyomatous or sarcomatous tumours are rare. They may grow from the stomach wall outwards as freely moving hard rounded tumours that look like uterine fibromas. If they arise from the

[2] Prof. Kelly later showed a film stressing this method.

posterior surface, they fill the lesser sac. They are liable to colliquative degeneration and then look like, and may be mistaken for, a wandering spleen or an ovarian cyst.

In 1927 I removed from the posterior wall of the stomach a tumour about the size of an orange (fig. 5A). To do this I resected the growth together with a portion of the posterior wall. It was the usual leiomyoma with colloid degeneration looking somewhat like a thyroid adenoma in colour. It weighed 1¾ lb. In 1931, four years later, at the ends of the scar in the stomach there were two recurrences, but this time the growths invaded the stomach cavity instead of the lesser sac. The radiograms were characteristic. Two large orange-like lumps caused rounded filling defects, but in the centre of each defect there was a small mass of barium (fig. 5B). These central holes on the apex of each recurrence were ulcers of the mucous membrane caused entirely by the tension of the growths producing anæmia of the mucous membrane and consequent ulceration.

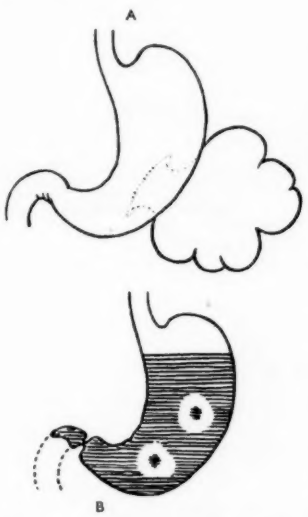

FIG. 5—A, Diagram of leiomyoma growing from posterior wall of stomach. B, Diagram of radiographic appearance of two recurrences growing from either end of scar and invading the stomach lumen.

I did a Polya's gastrectomy, and for another two years the patient remained well. Curiously enough she died of secondary growths in the liver which looked exactly as if the primary growth had been a carcinoma of the stomach.

I have not been able to make a film of a gastro-colic fistula, but I have a film showing the early steps in the operation for two jejunal ulcers found at either end of a gastro-enterostomy done twenty-six years ago. The ulcer can be seen on the colon, but it had not perforated. The film shows the early stages of the operation taken from two separate view-points, one a little closer than the other. The film used was the Kodachrome colour process, and it shows fairly accurately the stages up to, but not including, the suture of the intestine.

My conclusions will, I think, gain general acceptance. (1) Jejunal ulcers and gastro-colic fistulæ are serious sequelæ of the operation of gastro-enterostomy. They occur in 2–5 per cent. of all cases—most frequently after duodenal ulcerations, especially after operations for perforated duodenal ulcer. (2) For all gastric ulcerations there is no doubt that Polya's gastrectomy is the operation of choice. It is probably the best operation for secondary ulceration, but even a subtotal gastrectomy does not necessarily obviate further jejunal ulceration and even perforation. (3) In peptic ulceration of all kinds rigid starvation before or after operation may be positively harmful and conducive to further ulceration.

THE ŒSTROGENIC PROPERTIES OF "STILBŒSTROL" (DIETHYL-STILBŒSTROL)

A CLINICAL AND EXPERIMENTAL INVESTIGATION *

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DURING the past five years the attention of organic chemists has been directed towards the œstrogenic activity of certain synthetic compounds, which either in common with the naturally occurring œstrogens contain the phenanthrene ring system (Cook, Dodds, Hewett, and Lawson 1934), or lie outside this group (Dodds and Lawson 1936). It was shown (Dodds and Lawson 1937) that even such a simple substance as *p*-hydroxypropenyl benzene (anol), containing only one benzene ring, possessed similar œstrogenic activity in the ovariectomised rat to œstrone itself. A compound containing two benzene rings, 4 : 4′-dihydroxy-α : β-diethylstilbene (diethyl-stilbœstrol), described by Dodds, Golberg, Lawson, and Robinson (1938) was found to compare favourably with the natural œstrogens in its biological properties (Dodds, Lawson, and Noble 1938) and to be highly active by the oral route. Some interesting effects of the administration of this compound by mouth to rodents have been reported recently by Parkes, Dodds, and Noble (1938) and the present communication is a preliminary account of its action on primates.

The *material* used in these tests was the compound diethyl-stilbœstrol, which for convenience will be referred to below by the abbreviated name of "stilbœstrol." It was given by mouth in tablets containing 0·1 mg., 1 mg., and 5 mg., and by intramuscular injection in oil solutions containing 1 mg. and 5 mg. per c.cm. It was tested clinically in a series of patients attending the endocrine clinic at Guy's Hospital and the obstetric unit at University College Hospital, and experimentally on six monkeys at the department of human anatomy, Oxford.

EFFECT OF STILBŒSTROL ON PATIENTS WITH AMENORRHŒA (table I)

Stilbœstrol was administered to eighteen patients with amenorrhœa of variable duration. "Œstrin withdrawal bleeding" was provoked in eight, and rhythmical uterine hæmorrhage occurred during the period of administration in two further cases. Of the cases that did not respond by uterine bleeding, one (Case 2) had previously failed to respond to the administration of natural œstrogens, and one (Case 6) had received no previous œstrogenic therapy but was a case of amenorrhœa of 8 years' duration, the symptoms accompanying the onset of the syndrome of anorexia nervosa. Six patients failed to respond to the synthetic œstrogen though previous courses of œstradiol benzoate had resulted in withdrawal bleedings. Of these six cases, two (Nos. 15 and 18) had received a total dose per course of 20 mg. of

* A report to the Therapeutic Trials Committee of the Medical Research Council.
† British Drug Houses research fellow since October, 1937.

stilbœstrol by injection, and had previously responded to courses of 12 mg. of œstradiol benzoate, one (Case 16) failed to respond either to 28 mg. by mouth or 4 mg. by injection of the synthetic hormone though she had bled after courses of 12 mg. of œstradiol benzoate by injection. Two patients (Cases 10 and 11) failed to respond to courses of 14 mg. administered orally though they had experienced withdrawal bleedings after 25 mg. courses of œstradiol benzoate, and the last patient (Case 14) failed on

TABLE I—AMENORRHŒA (18 cases)

Case	Age	Duration of amenorrhœa	Previous endocrine treatment	Result	Stilbœstrol					Remarks
					Mode of administration	Single dose (mg.)	Total dosage (mg.)	Result	Withdrawal interval in days	
1	18	Primary	—	—	Oral " "	1 1 1	14 14 14	W.B. " "	—	Endometrium—proliferative phase. Development of breasts and cervix. Pituitary infantilism.
2	22	Primary	Œst. benz., 50 mg. Ambinon, 3600 units	Nil Nil	Inj.	5	5	Nil	—	—
3	19	3 yrs.*	Œstrone for some months	Nil	Oral "	1 5	14 70	Nil W.B.	9	—
4	28	7 yrs.	Œst. benz. and progesterone. Pgt. M.S. ext., 1600 units	W.B. Nil	Oral	5	70	W.B.	6	—
5	29	7 yrs.	Œst. benz., 25 mg.; 4 courses. Pgt. M.S. ext.; 4 courses of 56 E.U.	Bleeding One response	Oral	1	21	W.B.; spontaneous bleeding 28 days later	6	—
6	29	8 yrs.	—	—	Oral "	1 5	84	Nil	—	Amenorrhœa commenced as a symptom of anorexia nervosa.
7	30	4 yrs.	7 courses œst. benz., 25 mg. Pgt. M.S. ext., 2 courses	6 W.B. No response	Oral "	1 1	14 14	W.B. Nil	8	Put on 9 lb. in weight since commencing treatment with stilbœstrol; lost 2 lb. in 2 weeks after ceasing treatment.
8	23	2 yrs.	—	—	Inj. Oral "	1 1 1	5 14 14	W.B. " "	8	Uterus grown 1 cm. Endometrium—atrophic→proliferative. Anorexia nervosa.
9	21	3 yrs.	Œst. benz., 10·25 mg.; 8 courses	6 W.B.	Oral "	1 5	14 70	Nil W.B.	6	—
10	28	2 yrs.	2 courses œst. benz., 25 mg.	W.B. after last course	Oral "	1 1	14 14	Nil Nil	—	—
11	24	19 mths.	5 courses œst. benz., 25 mg.	W.B. on all occasions	Oral	1	14	Nil	—	—
12	24	9 mths.	Dummy inject. Pgt. M.S. ext., 40 E.U. × 10. Pgt. M.S. ext., 40 E.U. × 10 + œst. benz., 25 mg. Œst. benz., 25 mg.	Nil Nil W.B. W.B.	Inj.	1	4	W.B.	—	—
13	20	3 mths.	—	—	Oral	1	49	Regular bleeding after treatment	—	—
14	19	Oligom. every 3 mths.	4 courses œst. benz., 25 mg.	2 W.B.	Oral	1	21	Nil	—	—
15	22	7 yrs.	5 courses œst. benz., 12 mg.	W.B. on each occasion	Inj. "	1 5	4 20	Nil Nil	—	Amenorrhœa as a symptom of anorexia nervosa.
16	30	4 yrs.	4 courses œst. benz., 12 mg.	W.B. on each occasion	Oral Inj.	2 1	28 4	Nil Nil	—	—
17	30	2 yrs.	Œstrone, 0·3 mg. daily by mouth for 2 months	Menses regular for 7 months	Oral	3	42	Menses returned	—	—
18	23	2 yrs.	Œst. benz. Progesterone. Pgy. urine ext. 5 courses œst. benz., 12 mg.	3 W.B.	Inj. "	1 5	4 20	Nil Nil	—	One response to Pgt. M.S. ext. after stilbœstrol had failed.

* One menses at 16 only.

Oligom. = oligomenorrhœa. Œst. benz. = Œstradiol benzoate. Pgt. M.S. ext. = Pregnant mare serum extract. W.B. = Withdrawal bleeding. Inj. = injection.

TABLE II—MENOPAUSAL SYNDROME (15 cases)

Case	Age	Age of menopause	Previous treatment	Subjective response	Smear	Stilbœstrol				Remarks
						Single dose (mg.)	Total dosage (mg.)	Subjective response	(*a*) Smear (*b*) Effect on blood pressure	
19	47	47	Dummy tablets (8) Œstrone, 0·1 mg. (1) Œstrone, 0·9 mg. (2) Œstriol, 5000 units (1) Ethinyl œstradiol, 0·1 mg. (1) 0·15 mg. (1)	Impr. Nil Some impr. Impr. Sl. impr. Impr.	 Sl. impr.	0·1	1·4	Nil	(*b*) Nil	—
20	61	56	Dummy tablets (3) Œstrone, 0·1 mg. (1) Transœstradiol, 0·1 mg. (1) Ethinyl œstradiol, 0·1 mg. (4 tabs.)	Sl. impr. Sl. impr. Nil Nil	 Sl. impr. Sl. impr.	0·1 0·1	1·4 1·4	Some impr., headaches Nil	(*b*) Nil	Nausea and palpitation with ethinyl œstradiol.
21	44	42	Ethinyl œstradiol, 0·1 mg. (1)	Nil		0·1 1·0	1·4 28·0	Nil Nil	(*a*) Nil	Domestic worries probably account for some of the symptoms.
22	51	49	Dummy tablets (7) Ethinyl œstradiol, 0·1 mg. (1) 0·15 mg. (1)	Impr. Cons. impr. Controlled	Nil Impr. Œstrous	0·1 0·1	0·5 1·4	Nil Nil	(*a*) Sl. impr.	Nausea and headache with stilbœstrol, which had to be abandoned. No nausea with second course.
23	50	48	Dummy tablets (6) Transœstradiol, 0·1 mg. (1) Ethinyl œstradiol, 0·1 mg. (1) 0·15 mg. (1)	Nil Nil Impr. Impr.	Nil Sl. impr. Œstrous	0·1 0·1	1·4 1·4	Impr. Nil	(*a*) Œstrous (*b*) Nil	—
24	45	45	Dummy tablets (6) Œstrone, 0·1 mg. (2) Œstrone, 0·3 mg. (1) Œstrone, 0·5 mg. (1) Œstrone, 0·6 mg. (1) Œstriol, 5000 units (11) Œstriol, 2500 units (4) Transœstradiol, 0·1 mg. (3) Transœstradiol, 0·15 mg. (2) Ethinyl œstradiol, 0·1 mg. (2)	Nil Sl. impr. Fl. 81 Fl. 46 Fl. 32 Fl. under control Occ. → 61 Fl. occas. Fl. 61→25	Nil Sl. impr. Impr. Impr.	0·1 1·0 0·1	1·4 14·0 1·4	Nil. Fl. 74 Impr. Fl. 21 Nil. Fl. 118	— (*a*) Œstrous (*a*) Nil	—
25	44	Menses irreg. for 6 mths.	Dummy tablets (7) Œstrone, 0·1 mg. (1) Transœstradiol, 0·1 mg. (1) 0·15 mg. (1) Ethinyl œstradiol, 0·1 mg. (1) 0·15 mg. (1)	Sl. impr. with 1 crse. Sl. impr. Nil Nil Impr. Fl. 83→0 Impr.	Nil Sl. impr. Impr. Sl. impr. Impr.	0·1	2·8	Nil	(*a*) Slight impr. not maintained	Nausea after ethinyl œstradiol 0·1 but not after 0·15 mg.
26	50	48	Dummy tablets (9) Œstrone, 0·1 mg. (1) Transœstradiol, 0·1 mg. (2) Ethinyl œstradiol, 0·1 mg. (1) 0·15 mg. (1)	Nil Nil Impr. Impr. Impr.	Nil Impr. Nil Œstrous Œstrous	0·1	2·8	Nil	(*a*) Œstrous	—
27	31	32	Œstradiol benzoate, 3 courses, 20 mg.	3 W.B.	—	5·0 (inj.)	20·0	W.B.	—	Castrated 9 yrs. previously.
28	37	36	Œstradiol benzoate, 30 mg.	Fl. from 10–12 daily to none	—	1·0 (inj.) 2·0 3·0	6·0 14·0 6·0	Nil Sl. impr. Nil	— — —	Radium menopause 10 mths. previously. Vomiting.
29	49	47	Œstradiol benzoate, 30 mg.	Fl. from 10–12 daily to none	—	1·0 (inj.) 2·0 3·0	6·0 14·0 6·0	Nil Sl. impr. Nil	(*b*) No effect	Vomiting.
30	42	42	Œstrone, 0·3 mg. for 14 days	Controlled	Impr.	2·0	28·0	Controlled	(*a*) Nil	—
31	39	36	Œstradiol benzoate, 48 mg.	Controlled	—	1·0 (inj.)	6·0	Improved	—	—
32	54	51	—	—	—	3·0	42·0	—	(*a*) Impr.	—
33	42	41	—	—	—	1·0 (inj.) 1·0 2·0	4·0 14·0 28·0	Nil Sl. impr. Impr.	—	—

Sl. impr. = slight improvement. Fl. = flushes.

TABLE III—ATROPHIC VAGINITIS (10 cases)

Case	Age	Age of menopause	Previous treatment	Local response	Subjective response	Smear	Stilbœstrol					Remarks
							Single dose (mg.)	Total dosage (mg.)	Local response	Subjective response	Smear	
34	65	48	—	—	—	—	1·0	56·0	Consid. impr.	Impr.	Sl. impr.	—
35	46	44	—	—	—	—	1·0 (inj.)	12·0	Nil	Nil	Nil	Trichomonas infection of kraurosis.
							1·0	42·0	Nil	Nil	Nil	
36	55	48	—	—	—	—	5·0 (inj.)	20·0	Cure	Impr.	Œstrous	—
							1·0	14·0	Maint.	Maint.	Maint.	
							0·1	2·8	Maint.	Maint.	Maint.	
37	42	Menses reg.	—	—	—	—	1·0	56·0	Nil	Nil	Nil	? condition not due to ovarian deficiency.
38	41	Scanty loss for 2 yrs.	Œstrone, 155 mg., 1 mg. + 5 mg.	Impr.	Impr.	Impr.	1·0	28·0	Impr. maint.	Impr.	Impr.	—
39	60	50	Dummy tablets (4)	Nil	Sl. impr.	Nil	1·0	28·0	Impr. maint.	Impr.	Impr.	—
			Œstrone, 0·1 mg. (1)	Nil	Nil	Sl. impr.						
			Transœstradiol, 1 mg. (2)	Nil	Nil	Impr.						
			Œstrone, 1 mg. (inj.) Total, 18 mg.	Cured	Cured	Impr.						
			Œstrone, 1 mg. (oral) (1)	Maint.	Relapse	Maint.						
40	68	42	Œstrone, 0·3 mg. (1)	Sl. impr.	Nil		1·0	14·0	Impr.	Swollen breasts	Impr.	—
			Œstrone, 12 mg. (inj.)	Impr.	Impr. (swollen breasts)							
			Œst. benz., 35 mg.	Maint.	Breasts still sore	Œstrous						
			Œstrone, 1 mg. (3)	Impr.	Breasts sore, abdomen swollen	Œstrous						
41	66	43	Œstrone, 8·4 mg.	Cure	Cure	—	1·0	28·0	Impr.	Impr.	Impr.	—
42	64	57	Œstrone, 30 mg. (inj.)	Cure	Temporary impr.	Œstrous	0·1	1·4	Nil	Nil	Nil	—
			Œstrone, 1 mg. (1)	Maint.	Nil	Maint.						
			Œst. benz., 20 mg.	Maint.	Sl. impr.	Maint.						
43	51	39	Œst. benz., 60 mg.	Cure	Cure	Œstrous	5·0 (inj.)	20·0	Impr.	Impr.	Impr.	—

Maint. = maintained.

21 mg. stilbœstrol by mouth, whereas a successful result had been obtained on two occasions out of four with 25 mg. of œstradiol benzoate by injection.

Of the ten successful cases, three had received no previous œstrogenic therapy, but responded to such low doses as 14 mg. by mouth or less. One of these (Case 1) was a girl of 18 who had never menstruated and showed the characteristic syndrome of pituitary infantilism. After one course of 14 mg., endometrium in the proliferative phase was collected (fig. 5) though no endometrium could be obtained when curettage was attempted before treatment. A second (Case 8) showed a hypoplastic uterus and an atrophic endometrium before treatment, whereas after one course of 5 mg. by injection the uterus had lengthened by 1 cm. and an endometrium undergoing proliferation was obtained on curettage. One patient (Case 3), who had failed to respond previously to œstrone, bled after 70 mg. but not after 14 mg. of the synthetic hormone. Five patients had previously received courses of 25 mg. of œstradiol benzoate, resulting in withdrawal bleedings. One of them (Case 12) bled after 4 mg. stilbœstrol by injection, another (Case 7) after 14 mg. of the synthetic hormone by mouth, a third (Case 5) after 21 mg., and the fourth (Case 4) after 70 mg. by mouth, whereas the last responded to 70 mg. but not to 14 mg. by mouth. The ninth patient (Case 17) recovered her regular menstrual rhythm with daily doses of 0·3 mg. of œstrone by mouth, and after a subsequent period of amenorrhœa with daily doses of 3 mg. of stilbœstrol by mouth.

EFFECT OF STILBŒSTROL IN THE MENOPAUSAL SYNDROME AND IN ATROPHIC CONDITIONS OF THE VAGINA (tables II and III)

In these cases symptomatic relief (especially in regard to the daily frequency of hot flushes), vaginal smear pictures, and improvement of the local condition (of the vagina) were taken as the main criteria of response. Of twenty-five patients, eight failed to respond to the administration of the synthetic hormone. Of these, five received relatively small doses, totalling 2·8 mg. or less, though three of these (Cases 19, 20, and 25) had reacted satisfactorily to lower doses of ethinyl œstradiol (a partially synthetic compound of natural œstrogen already shown to be highly active by mouth (Parkes, Dodds, and Noble 1938)). Of the remaining three, two were suffering from atrophic vaginitis (Cases 34 and 36); neither had received previous œstrogenic therapy, and in both there was a doubt as to whether the local condition was primarily due to the effects of ovarian deficiency. The third case (No. 21) had failed to react to low doses of ethinyl œstradiol, and the

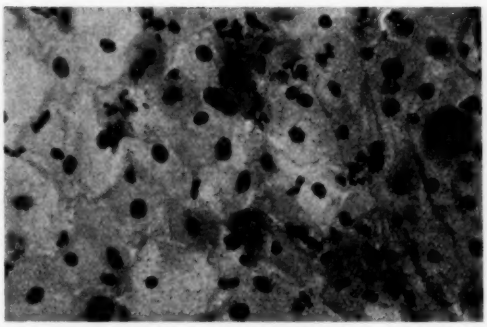


FIG. 1 (Case 39)—Vaginal smear after œstrogenic therapy had been discontinued for one month. Epithelial cells polyhedral and small with large nuclei. Leucocytes. (× 400.)

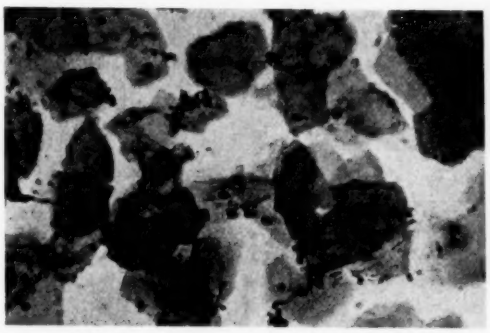


FIG. 2 (same case)—After 1 mg. stilbœstrol by mouth daily for 14 days. Cornified cells with curling edges and small pyknotic nuclei. Fewer leucocytes. (× 400.)

assessment of symptomatic response was complicated by the existence of domestic worries.

Of the successful cases, one (No. 23) reacted to 0·1 mg. by mouth daily for a fortnight both symptomatically and with the production of an œstrous smear (though the improvement was not maintained after a further course). She had responded similarly to ethinyl œstradiol. Another case (No. 24) failed to respond to doses of 0·1 mg. but reacted satisfactorily to 1 mg. doses both as regards the fortnightly hot flush count and the vaginal smear. She had responded satisfactorily to daily doses of 0·1 mg. of ethinyl œstradiol. In all the other cases doses of 1 mg. or over produced satisfactory responses. Symptomatic improvement was almost always associated with a transformation of the vaginal smear to the œstrous type.

RELIEF OF DYSMENORRHŒA WITH STILBŒSTROL

Two cases of dysmenorrhœa were completely relieved by the administration of daily tablets of 1 mg. of the synthetic hormone, given during the first half of the cycle. They had experienced similar relief from four injections of 5 mg. of œstradiol benzoate.

EFFECT OF STILBŒSTROL ON THE EPITHELIUM OF THE MAMMARY GLANDS

An opportunity occurred of recording the effect of the synthetic hormone on the breast by means of biopsy of the mammary tissue before and after the administration of 280 mg. by mouth. The epithelium was found to be proliferated and showed increased activity, which was, however, entirely benign and no suggestion of malignancy or precancerous changes was recorded. (We are indebted to Prof. G. W. Nicholson for his opinion on these sections.) It may be noted that in Case 7 of the atrophic vaginitis series, 1 mg. of stilbœstrol by mouth for 14 days gave rise to painful swelling of the breasts. This patient had previously complained of this condition while being treated with injections of the natural œstrogen in the form of œstrone and œstradiol benzoate.

"TOXIC" EFFECTS OF STILBŒSTROL

The synthetic hormone has been administered to forty-six patients in the series recorded here and to five other patients. Nausea and headache were experienced by one patient (Case 22) when she was first given stilbœstrol, but she complained of no such symptoms when receiving a course of the same doses a month later. Vomiting occurred in two cases (Nos. 28 and 29). Similar effects have been recorded with ethinyl œstradiol. In all cases the material has been given by mouth. It has been suggested that these symptoms are due to the rapid and relatively complete absorption of these substances when given by the oral route, but it should be pointed out that in one of our cases the symptoms appeared after

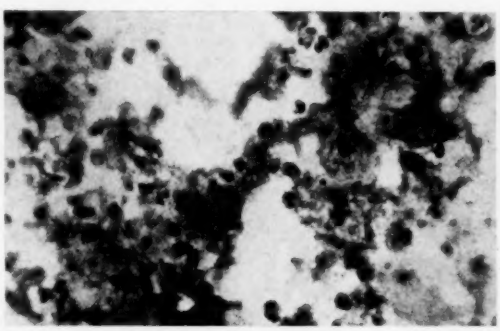


FIG. 3 (Case 41)—Vaginal smear 17 months after œstrogenic therapy. Few epithelial cells. Many leucocytes and clumps of bacterial debris. The epithelial cells have a very indefinite outline and large nuclei. (× 400.)

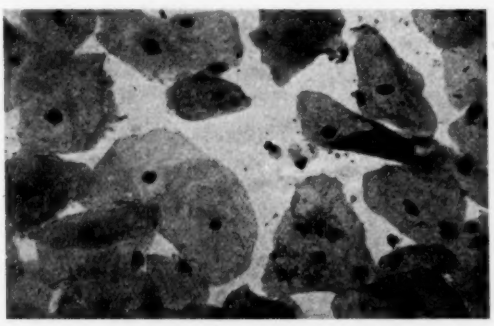
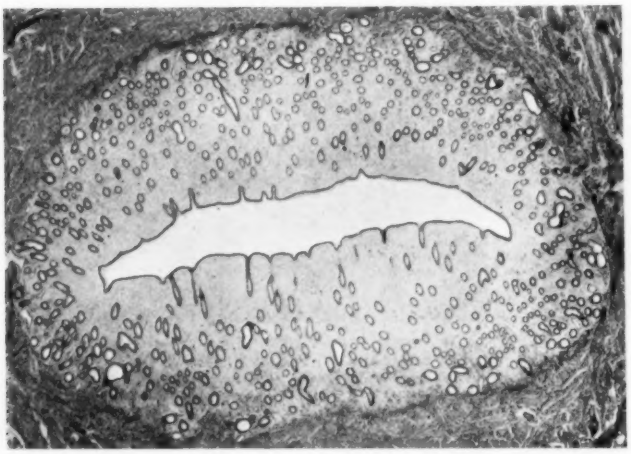
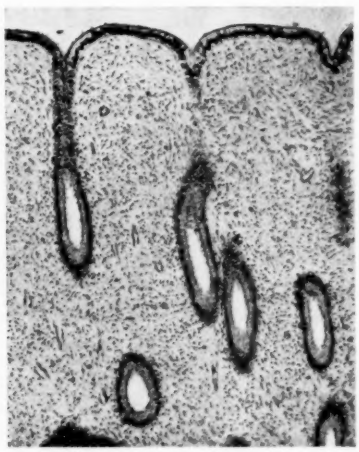


FIG. 4 (same case)—After 1 mg. stilbœstrol by mouth daily for 28 days. Cornified cells with curling edges and small pyknotic nuclei. No debris. A few bacteria. Very few leucocytes. (× 400.)





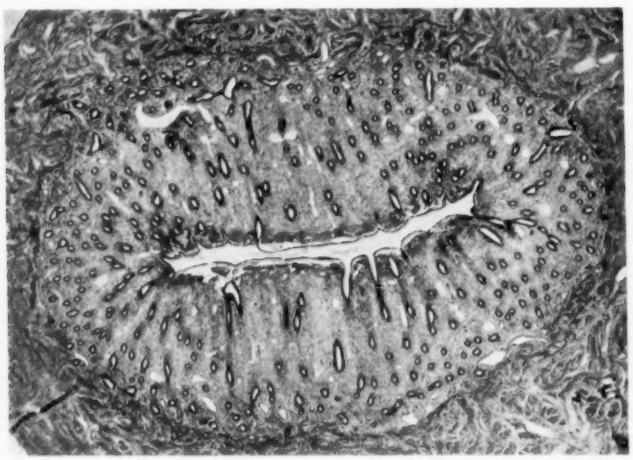
FIGS. 6 and 7—Endometrium of a spayed rhesus monkey (No. 203) after fourteen daily injections of stilbœstrol (fig. 6 × 13; fig. 7 × 73).

4 tablets of 0·1 mg. and that, on the other hand, one of our patients received 5 mg. by mouth daily for two months, making a total of 280 mg. without experiencing any such symptoms. We are not, therefore, prepared to discuss the possible causes of these effects, and are of the opinion that they should not be cited, in the light of our present experience, as a contra-indication to the use of this preparation as an œstrogenic agent. The possibility that stilbœstrol may be less likely to give rise to such side-effects when given in esterified form is to be tested.

EXPERIMENTS ON RHESUS MONKEYS

Preliminary experiments have been carried out on six adolescent and mature spayed rhesus monkeys (*Macaca mulatta*) whose body-weights varied between 4·3 and 6·0 kg. Two were used for histological study and four for determining the threshold dose of stilbœstrol necessary to produce enough change in the endometrium for the cessation of its effect to be followed by uterine bleeding.

The first animal (203) was injected daily with increasing doses of an oil solution of the synthetic hormone. Injections were made intramuscularly and a total of 2·7 mg. was administered. The animal's sexual skin, face, and nipples became a brilliant red during the course of the injections, the sexual-skin coloration extending as far down as the ankles. Milk could not be expressed from the nipples. The uterus and vagina were removed on the day after the last injection and were examined histologically (figs. 6 and 7). They show the usual effects of œstrogenic stimulation, and the degree of glandular proliferation in the uterus is at least as great as that which occurs as a result of the injection of a similar amount of œstrone (Zuckerman 1937). There is no evidence of any abnormal proliferation or cytological change in any part of the body of the uterus or cervix.



FIGS. 8 and 9—Endometrium of a spayed rhesus monkey (No. 181) on the first day of uterine bleeding after a 14-day course of stilbœstrol injections (fig. 8 × 16; fig. 9 × 73).

The second animal (181) was injected daily for fourteen days with a maximum of 50 γ of stilbœstrol a day (total injected: 0·58 mg.). The sexual-skin response was again very pronounced. The coloration decreased fairly quickly and seven days after the cessation of injections uterine bleeding set in. The effects of stilbœstrol were thus the same as those of œstrone. The uterus was removed on the first day of bleeding and examined histologically (figs. 8 and 9). In appearance it is identical with that of a uterus on the first day of bleeding after a course of œstrone injections (Zuckerman 1937). The stroma is far less œdematous than at the end of stilbœstrol treatment (figs. 6 and 7) and the endometrial blood-vessels are widely dilated. There is considerable extravasation of blood, and as a result of the formation of superficial blood lakes, the surface epithelium is lifted and torn, and blood and loose stroma tissue are escaping into the cavum uteri.

FIG. 5 (Case 1)—On the first day of bleeding after 1 mg. stilbœstrol by mouth daily for 14 days. Shows a gland lined by columnar epithelial cells, typical of the proliferative phase. (× 250.)

As noted above, the remaining four animals were used to estimate the lowest dose of the drug which will stimulate uterine bleeding in spayed rhesus monkeys. Only a single injection was given in each of these experiments. It appears that the threshold, estimated in this way, is in the region of 0·5 mg., which is approximately the same as that of œstrone, when determined by the same method. One animal, however, failed to bleed after the injection of 5 mg. The latent interval intervening between the injection and the onset of bleeding averaged twelve days, and bleeding lasted 5–7 days. As is usual in young rhesus monkeys during phases of œstrogenic stimulation, the sexual skin of the youngest of the animals tested showed swelling as well as coloration, a fact which indicates water-retention (Krohn and Zuckerman 1937, Guthkelch and Zuckerman 1937). The swelling subsided before the onset of uterine bleeding.

None of the animals tested showed any adverse symptoms as a result of the treatment.

DISCUSSION

From the few cases in the amenorrhœa series it is not easy to make a comparison of the relative potency of œstradiol benzoate and stilbœstrol. When both are injected, account should be taken of the fact that the synthetic hormone, not being esterified, is much more rapidly excreted or inactivated than the benzoate of œstradiol; it is therefore not wholly surprising that 20 mg. of stilbœstrol by injection failed to produce bleeding where 12 mg. of œstradiol benzoate had been successful (Cases 15 and 18), since each was injected in doses spaced at 3-day intervals. On the other hand, 28 mg. of stilbœstrol by mouth failed where 12 mg. of œstradiol benzoate by injection had succeeded (Case 16). What is striking, however, is that as small a dose as 14 mg. by mouth of the synthetic compound succeeded in inducing hæmorrhage in a number of cases, one of which was a girl of 18 who had never menstruated.

It appears from the cases in the menopause series that whereas stilbœstrol is effective by mouth in controlling both the subjective and objective manifestations of the climacteric, it is not quite so efficient in the lower dose range as ethinyl œstradiol.

CONCLUSIONS

Stilbœstrol (diethyl-stilbœstrol) administered orally imitates the effects of the natural œstrogens by:—

1. Producing "œstrin withdrawal bleeding."
2. Producing an intermenstrual type of endometrium both in the human female and in the monkey.
3. Inducing growth of the hypoplastic uterus.
4. Relieving the symptoms of the menopausal syndrome.
5. Converting a "menopausal" into an "œstrous" type of vaginal smear.
6. Restoring the normal appearance of the vulva and vagina when they have become atrophic as the result of the œstrogen deficiency of the climacteric.
7. Inducing painful swelling of the breasts.
8. Causing proliferation and activation of the epithelium of the mammary glands.
9. Relieving the pain of dysmenorrhœa.

Its œstrogenic activity when given by injection corresponds with that of œstrone.

Nausea or vomiting has been noted in 3 out of 46 patients receiving stilbœstrol in tablets by the mouth. The occurrence of these symptoms does not in our experience depend on the dosage given.

SUMMARY

The œstrogenic properties of the synthetic hormone stilbœstrol (diethyl-stilbœstrol) have been investigated on 46 women and 6 monkeys. It appears to imitate the natural œstrogens faithfully and to be highly active when administered by mouth.

Our thanks are due to Boots Pure Drug Co. Ltd. and British Drug Houses Ltd. who kindly supplied us with the material used, and to Dr. A. C. Hampson and Mr. H. A. Hamilton who actively coöperated in that part of the investigation which was carried out at the Guy's Hospital endocrine clinic. The monkeys used in the experiments reported in this paper were bought with the aid of a grant to S. Z. from the Medical Research Council. The investigation was undertaken at the request of the Therapeutic Trials Committee of the Medical Research Council.

REFERENCES

Cook, J. W., Dodds, E. C., Hewett, C. L., and Lawson, W. (1934) *Proc. roy. Soc.* B, **114**, 272.
Dodds, E. C., and Lawson, W. (1936) *Nature, Lond.* **137**, 996.
— — (1937) *Ibid*, **139**, 627.
— Golberg, L., Lawson, W., and Robinson, R. (1938) *Ibid*, **141**, 247.
— Lawson, W., and Noble, R. L. (1938) *Lancet*, **1**, 1389.
Guthkelch, A. N., and Zuckerman, S. (1937) *J. Physiol.* **91**, 269.
Krohn, P. L., and Zuckerman, S. (1937) *Ibid*, **88**, 369.
Parkes, A. S., Dodds, E. C., and Noble, R. L. (1938) *Brit. med. J.* **2**, 557.
Zuckerman, S. (1937) *Proc. roy. Soc.* B, **123**, 457.

THE TREATMENT OF PYLORIC STENOSIS WITH EUMYDRIN

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THOUGH it is nearly three years since Elizabeth Svensgaard's paper was published, the few reports that have subsequently appeared on the value of antispasmodics in congenital pyloric stenosis indicate that their use in this country has not met with general adoption.

Svensgaard (1935) reported a large number of cases treated medically. One series of 61 patients, of whom 2 died, was treated with Eumydrin (atropine methylnitrate), and her figures show the superiority of this drug over atropine. All her patients were kept in hospital during treatment, and the average stay in hospital was 77 days.

Mackay (1936) reported 2 cases and Dobbs (1937) 3 successfully treated with eumydrin. Mackay's patients were in hospital for the duration of the treatment, but further patients were alluded to who had been discharged before the completion of treatment. Dobbs's 3 patients are included in the present series as Cases 1, 2, and 3.

Braithwaite (1938) published 21 cases, of which 3 were fatal and 3 did not respond to treatment. The duration of treatment was 2½ weeks in the shortest and 12½ weeks in the longest case, with an average of 5½ weeks for those that were successful. It appears that the patients remained in hospital for the duration of treatment.

Findlay (1938a) mentions 6 consecutive successful cases of an unpublished series.

These reports, so far as they go, support the thesis that eumydrin is of value in the treatment of pyloric stenosis. However, there have not been any reports of infants being treated wholly or partly as out-patients. As Findlay points out, the administration of a teaspoonful of medicine before each feed by the mother seems such a simple procedure that the possibilities of eumydrin as an out-patient remedy for, at all events, some cases of pyloric stenosis should be explored.

The 20 children of the present series were treated with eumydrin as in-patients for as short a time as possible, and treatment was continued in the out-patient department. One died and three had to be operated on, but the remaining 16 were cured, and this result suggests that further work will establish the type of case in which eumydrin can become a valuable alternative to surgery in the treatment of pyloric stenosis.

SURGICAL TREATMENT

Analysis of the reports of cases treated surgically shows that the cause of death is most frequently "medical" in that it was not directly due to surgical measures for the relief of obstruction. Table I summarises the cause of death in three large series published in the last eight years.

It will be seen that the commonest cause of death was vitality apparently insufficient to survive operation. It was first noted by Hartmann and Smythe (1926) and later in this country by Graham and Morris (1929) and by Maizels, McArthur, and Payne (1930) that alkalosis was often present in pyloric stenosis, and it is now realised that most of these deaths can be avoided not by an emergency operation done as rapidly as possible but by postponing operation until dehydration and alkalosis have been corrected.

The second group of deaths, also large, comprises those from either gastro-enteritis or respiratory infection. That these can also be avoided is shown by their absence in private practice (Herzfeld and Wallace 1935, Thompson and Gaisford 1935, and Jewesbury and Page 1937), and in series done under conditions approaching those found in private (Levi 1936, and Harris and Keynes 1937).

The third group, very much smaller than the preceding two, is truly surgical, the causes of death being hæmorrhage, peritonitis and sepsis, and continued vomiting.

TABLE I—CAUSES OF DEATH IN PYLORIC STENOSIS

Authors	Cases	Total deaths	Deaths after operation	Due to infection	Due to operation	Due to various causes
Wallace and Wevill (1934)	145	36	24	9	3	—
Thompson and Gaisford (1935)	210	30	13	11	?	6
Jewesbury and Page (1937) ..	303	33	13	8	8	4

CRITERIA FOR MEDICAL TREATMENT

The treatment of pyloric stenosis, then, is threefold: (1) the dehydration and alkalosis have to be corrected; (2) the obstruction at the pylorus has to be relieved; and (3) the child has to be protected from the infections to which he is peculiarly liable and his alimentary canal re-educated to its function of digestion. The first and third stages of this treatment are usually in the hands of the physician.

The relief of obstruction may be achieved either medically or surgically. Operation, however, is so satisfactory, and—in this country at least—the risks of infection from prolonged hospitalisation are so great, that before eumydrin will be looked upon with anything but scientific interest it will have to satisfy certain requirements:—

(1) It will need to be as easy to use as surgery and as free or freer from risk.

(2) The deaths occurring during treatment, but not due to the action of the drug, must, in similar circumstances, be at least as few as follow operation. This, in effect, means that the period of hospitalisation for medical treatment must approximate to that for operation, unless gastro-intestinal and respiratory infection can be avoided by suitable nursing technique. There should also be an improvement in the condition and a satisfactory gain in weight within a short time after beginning treatment.

(3) The eventual cure must be as complete as it is after operation. If it should become evident, in years to come, that many cases relapsed after medical treatment in infancy, surgery would remain the treatment of choice.

(4) If it appears that some patients respond rapidly to medical treatment, whereas others eventually come to operation, either some easy way of determining the two groups will be necessary, or the medical failures must not have become worse surgical risks during the time of medical treatment.

TREATMENT WITH EUMYDRIN

Cases.—The 20 cases analysed here include all those with pyloric stenosis admitted to the children's department, University College Hospital, since December, 1937, and I am greatly indebted to

Dr. W. J. Pearson for permission to use their records. To these are added those cases of pyloric stenosis which came under my care at the Princess Louise Kensington Hospital and the Queen's Hospital, Hackney Road. All cases so diagnosed are included except two: one patient died a few hours after admission and before either medical or surgical treatment could be instituted; in the other case vomiting had been present for nine weeks before admission, and, though a tumour was palpated, the child was making a slight but regular gain in weight.

Diagnosis was made on a typical history, visible peristalsis, and a palpable pyloric tumour. These criteria were present in all except Case 4, in which the pylorus was not palpated. This case was in all other ways typical, and barium was held up in the stomach up to five hours. In addition the majority were radiographed and showed great delay in the emptying-time. On the whole the value of radiography in diagnosis based on the emptying-time, as Findlay (1938b) has shown, is doubtful. In the present series there seemed to be little correlation between the severity of the symptoms and the degree of retention, and since it was not found to give a good indication of response to treatment radiography was often omitted in the later cases of this series.

Treatment.—The routine adopted was similar in all cases and was based on that advised by Svensgaard (1935). As soon as the child was seen, and unless it was contra-indicated, 1 drachm of barium cream in 1 oz. of milk was given by the mouth, and radiograms were taken at intervals of 8–12 hours. Meanwhile isotonic saline, to which was often added a 5 per cent. solution of dextrose, was given subcutaneously in sufficient quantities to relieve dehydration, as indicated by the clinical condition and by the passage of sufficient urine. After the last radiogram the stomach was washed out with normal saline until the fluid was returned clear. These preliminaries often meant that the child had little or no food during the first 12–18 hours after admission, but this was not found to be anything but beneficial. It is as important to delay the administration of eumydrin until dehydration and alkalosis have been relieved as it is to delay operation. Symptoms of poisoning in the one case or sudden post-operative collapse in the other will occur if this essential factor in treatment is omitted.

Feeding.—After the last radiogram, feeding, preceded by the administration of eumydrin, was begun. A feeding routine similar to that after operation was used. Breast-milk was used whenever possible—in nine of this series—failing which a half-cream lactic-acid milk. Feeds were given 2-hourly, starting with 2 drachms and increasing each feed by 2 drachms for the first 8 hours, after which 1 or 1½ oz. were given 2-hourly for the first day and 1½–2 oz. 3-hourly during the second. Full feeds were reached on the third or fourth day, though a daily intake of small volume but high calories was aimed at until all vomiting had ceased. In practice it was found that vomiting ceased more rapidly the more gradual the resumption of full feeds.

Eumydrin agrees closely with atropine in its systemic action. Its toxicity is about a fiftieth, and its antispasmodic action about half, that of atropine. It is very soluble in water and is fairly stable in 0·5 per cent. solution, but gradually deteriorates in weak solutions. The drug was given 20 minutes before each feed by the mouth as a 1 in 10,000 solution made up freshly each week. The dose varied somewhat from case to case, but in each the first two or three doses were of 1 c.cm. and for the first 8 hours, while feeding was 2-hourly, did not exceed 2 c.cm. Subsequently a dose of 3 or more c.cm. before each feed was tried and more given if vomiting had not much improved.

Fluid therapy.—The subcutaneous injection of saline was continued, after feeding began, as long as intake remained insufficient for the infant's requirements. Usually they were no longer necessary after the third or fourth day, though the tendency was to be rather more liberal than was clinically indicated. Eumydrin, like atropine, is excreted in the urine, and a satisfactory diuresis is of primary importance if toxic effects are to be avoided.

Stomach wash-outs.—A daily stomach wash-out, before the first feed, seemed to be of great value in some of the cases and was a routine for the whole series. The daily removal of accumulated curds and mucus would seem to be indicated theoretically, and it was, in practice, striking to watch the diminution in the quantity of the residue during the first few days, after which it usually became negligible. In the later cases of the series this became one of the indications for the discharge of the patient.

Out-patient treatment.—As soon as vomiting was reduced to not more than one or two small vomits a day, the stomach residue was not more than a drachm or two, and there were no other contra-indications, the child was discharged to its home with careful instructions to the mother about feeding and the administration of eumydrin. Thereafter the child was seen twice a week and later once a week until the end of treatment. At the end of 5–10 weeks from the onset of treatment the dose of eumydrin was halved at each feed for a week, then given on alternate feeds for a further week, and, if all was satisfactory, finally discontinued. The time for reducing the drug was rather arbitrary, the main factors influencing the decision being the response to the drug and the dose needed to control vomiting in the first few weeks.

Operation.—As soon as it was clear that the response to the drug was inadequate, its use was abandoned in favour of operation. Cessation of vomiting rather than gain in weight was the response relied on, since insufficient calorie intake, on the one hand, and fluid therapy, on the other, made gain in weight during the first week an unreliable index of progress.

RESULTS

The essential features of this series of 20 cases are shown in tables II and III: 16 infants were cured and, when seen between two months and two years later, were indistinguishable from normal children; 3 were operated on after eumydrin had failed satisfactorily to relieve the condition (these 3 did well after operation and were discharged having made satisfactory gains in weight, but 1 of them was later readmitted with a broncho-pneumonia from which he died); and 1 died during the administration of eumydrin.

Hospitalisation and readmission.—The average stay in hospital for 13 cases in which treatment was straightforward was 14 days. One child (Case 6) was kept in for 70 days, or a week longer than the duration of treatment, because the home conditions were not considered suitable. This opinion was amply justified during the next six months, during which the child was admitted on three occasions for conditions directly attributable to its home environment. Three children (Cases 5, 7, and 17) were readmitted after discharge, one of whom (Case 7) was subsequently operated on.

Case 5 was first discharged on the eighth day after admission. He was breast-fed and was receiving

1·5 c.cm. of eumydrin before each feed. After the first few days at home the supply of breast-milk failed, and the mother was soon afterwards removed to hospital with pneumonia. Unsuitable bottle-feeds were given without advice, and progress was slow with return of vomiting. On readmission the dose of eumydrin was raised to 4 c.cm. per feed and the feeding regulated. The vomiting ceased, and the child was discharged when the mother was well enough to have him home.

Case 7 was admitted with his mother and received breast-milk and complementary feeds. He apparently did well after the first week in hospital, though there was still one vomit a day at the time of his discharge on the twelfth day. On reaching home the mother gave up all breast-feeding and without advice fed the child three-hourly some ½–¾ oz. in excess of his needs. Vomiting returned, and he was readmitted five days later. His progress was this time less satisfactory, and after a fortnight's further trial he was operated upon by Mr. A. E. Porritt under local anæsthesia, and after a further ten days he was discharged doing well.

Case 17 was discharged on the fifteenth day and readmitted a week later. He had two small vomits during the five days at home, and the bowels, which had been constipated, became looser. The parents, who lived some eighty miles out of London, were very anxious for his readmission in spite of a 3 oz. gain in weight. His progress in hospital was steady, and during the following fortnight he gained 10 oz. in weight.

In each of these three cases there was a failure on the part of the mother: in Case 5 through lack of care, in Case 7 through illness, and in Case 17 through over-anxiety and remoteness from hospital. In addition it seems probable that they were discharged too early. They were in hospital, in the first place, 9, 12, and 14 days respectively, as against an average of 14 days in the successful cases, and gained 2, 2, and 4 oz. compared with an average of over 12 oz. The penalty for too early discharge, therefore, was ultimately a greatly prolonged period of hospitalisation and, in one case, resort to operation before final cure. It appears that, in judging the time of discharge to out-patients, the home environment should be carefully considered, and that facilities for fairly close supervision are necessary during the first three or four weeks of treatment.

Vomiting.—The amount of vomiting after treatment was started was very variable. In some cases there was almost no further vomiting of importance. Case 4—a borderline case—and Cases 9, 12, and 16 particularly responded very promptly. More often vomiting occurred once or twice a day for several days or tended to recur when the size of the feeds was increased too rapidly. In several cases occasional vomits up to once or even twice a day continued after discharge and were not incompatible with gain in weight. It was on the whole found to be more satisfactory, when they were not breast-fed, to give these patients high-calorie frequent feeds of small volume and to refeed after vomiting. These second feeds were almost invariably retained though a second dose of eumydrin was not given.

The smallest successful maintenance dose of eumydrin was 1·5 c.cm., the largest 6 c.cm., and the average over the series 3·7 c.cm. per feed. At first it was given for ten or twelve weeks before the dose was reduced, but later, and in those patients who responded promptly in the first place, it was discontinued earlier. The average time for the 16 successful cases was 9·3 weeks, though this includes Case 2 who went home with the prescription and failed to attend until written for 20 weeks after beginning treatment. The shortest times were 6 weeks in Case 19 and 7 weeks in Cases 9 and 12, and the longest 20 weeks in the above-mentioned Case 2. No patient in the series relapsed after eumydrin had been permanently discontinued, though it was purposely withheld for a few days during the first two or three weeks in Cases 2 and 4. In each, vomiting returned within twenty-four hours and was again controlled with eumydrin.

One patient, however, still under treatment and not included in this series, has had to go back on to eumydrin at home. This child, a typical "pyloric" with a palpable tumour, responded very well, and the drug was discontinued after 20 days, and he was sent home. There was no vomiting for the next 18 days, during which he put on 16½ oz. Thereafter vomiting returned up to one or two a day, the weight ceased to increase, and visible peristalsis, which had disappeared, returned. The pylorus was not palpated, but the vomiting was controlled, without readmission, with 5 c.cm. of eumydrin before each feed, which treatment was for a further period of nine weeks.

That the drug gradually becomes inactive was well shown in Case 1, who on discharge was, in error, given two weeks' supply of eumydrin. Vomiting returned on the tenth day, to cease within 48 hours of using a fresh supply.

Toxic symptoms.—The symptoms of atropine poisoning were carefully watched for but were not encountered, except in Case 8, who was at the time receiving 8 c.cm. three-hourly and, on one occasion, had a few minutes' flushing and excitement. A prolongation of the constipation usually found in pyloric stenosis seemed to be common but not invariable. Probably this was an effect of eumydrin. In this connexion Mackay (1936) has drawn attention to fullness of the abdomen in some of her patients during the time of administration of eumydrin.

The question also arises of the cause of death in Case 14, to whom eumydrin was given before dehydration had been satisfactorily treated. There was complete cessation of intestinal movement, amounting to paralytic ileus and leading to the death of the patient. This has not previously been reported in association with the administration of atropine derivatives but has been noted by Dr. R. C. Jewesbury (personal communication) in two patients with pyloric stenosis, one of whom died during the administration of eumydrin. In view of this and of the constipation and tumid full abdomen mentioned above and noted in some of the present cases, it seems not impossible that paralysis of the gut must be included as one of the toxic symptoms of eumydrin.

Infection.—Particular attention was paid to the avoidance of infection in this series of children. Whenever possible the child was nursed in a room or cubicle by itself. When the mother was feeding the child, she was, if possible, admitted with the child. Cases 2, 6, and 16 were, however, nursed in the open ward, and several others were removed to the open ward during the latter part of their stay in hospital.

Loose stools not amounting to gastro-enteritis were encountered several times after one to two weeks' treatment. This is a very common finding after operative treatment and can be reduced but not eliminated by breast-feeding with small and gradually increasing feeds. A moderately severe diarrhœa was present in Case 2 on admission, which continued for nearly three weeks before clearing up.

The only case of respiratory infection was that in Case 8, who developed broncho-pneumonia after his

discharge. He was readmitted for this infection and died.

Operations.—Three infants (Cases 7, 8, and 20) were operated upon after eumydrin had failed to relieve the condition (table II). Cases 8 and 20 were similar in that eumydrin seemed to have very little effect on the vomiting. Gain in weight was absent in both cases and was maintained only with frequent saline infusions. At operation, in Case 8 at the end of three weeks and in Case 20 at the end of a week, typical tumours were found. The third child operated on (Case 7) has also been discussed under Hospitalisation and Readmission. He responded well at first and while on the breast was sent home but had to be readmitted later. Only slow progress was made, and operation was considered advisable after a further nine days on eumydrin. A typical hypertrophied pylorus was found also in this case.

TABLE II—ANALYSIS OF CASES OF PYLORIC STENOSIS TREATED WITH EUMYDRIN

Case	Sex	Age (weeks)	Birth weight	Weight on admission	C.cm. per feed	Weeks given	Days in hospital	Gain in weight in hospital	Gain in weight in 8 weeks	Result
			lb. oz.	lb. oz.						
1	F.	5	7 5	7 0	3	13	14	12 oz.	3 lb.	Cured
2	M.	3	6 0	5 0	3	20	34	2 lb.	3½ lb.	Cured
3	M.	4	6 12	6 12	1½	14	19	0	2½ lb.	Cured
4	F.	4	9 4	8 12	2	9	7	8 oz.	4½ lb.	Cured
5	M.	8	8 12	10 0	4	9	8*	2 oz.	2 lb.	Cured
6	F.	6	6 4	4 0	2½	9	70	1¾ lb.	1¾ lb.	Cured
7	M.	4	7 4	7 8	5	3	—*	2 oz. at op.	1½ lb. (4 wks. after op.)	Operation
8	M.	3	8 0	7 6	Up to 8	1½	—	Nil at op.	1 lb. (4 wks. after op.)	Operation
9	M.	4½	8 12	8 4	4	7	13	1½ lb.	5 lb.	Cured
10	M.	4	10 0	7 0	4	11	15	1 lb.	4 lb.	Cured
11	F.	6	7 12	9 2	5	8	6	1 lb.	2½ lb.	Cured
12	M.	8	8 0	7 8	6	7	7	8 oz.	3 lb.	Cured
13	M.	7	7 8	7 8	3	8	15	6 oz.	3½ lb.	Cured
14	M.	4	5 6	5 8	7	1	10	—	—	Died
15	M.	7	10 0	10 5	4	11	8	Nil	2½ lb.	Cured
16	F.	4	7 0	5 2	4	9	15	1 lb.	2 lb.	Cured
17	M.	3	7 0	7 2	4	9	15*	4 oz.	1¾ lb.	Cured
18	M.	5	6 2	6 6	5	9	8	4 oz.	2½ lb.	Cured
19	M.	4	4 12	5 15	5	6	21	6 oz.	1½ lb.	Cured
20	M.	3	8 12	7 1	7	1	16 (total)	4 oz. loss at op.	1 lb. (4 wks. after op.)	Operation

* Readmitted.

TABLE III—SUMMARY OF TABLE II

—	—	Min.	Max.	Average in 16 successful cases
Cases .. 20	Dose (c.cm.) per feed ..	1½	7	3·7
Deaths .. 1	Weeks maintained ..	6	20	9·3
Operations .. 3	Days in hospital ..	6	70	14 (13 cases)
Cured .. 16				
Readmissions 3 (1 op.)				

The total time spent in hospital by these three patients was 35, 60, and 16 days respectively. This includes the time Case 7 spent at home before readmission and the prolonged post-operative stay in hospital of Case 8 considered advisable because of the home circumstances. Eventual recourse to operation meant therefore a greatly prolonged stay in hospital. The pre-operative deterioration of the infants, however, was in each case minimal and the immediate post-operative course uneventful. The gains in weight in the first month after operation were 1½ lb., 1 lb., and 1¾ lb. respectively.

Deaths.—Case 14 died on the twelfth day after admission and nine days after the start of administration of eumydrin. Vomiting, constipation, visible peristalsis, and a palpable tumour were present on admission, and, except that he had, in the first place, been a premature child and was smaller than most, there was nothing to differentiate him from the others. Eumydrin was started on the third day after admission, and 5 c.cm. was given before each feed without the gradual working up from 1 c.cm. or less as in the other cases. Vomits were reduced to one or two a day, but the gain in weight was slow. At the end of a week eumydrin was increased to 7 c.cm. per feed. Meanwhile, owing to an error, subcutaneous fluid had not been given for three days, and the child was much dehydrated. The next day he looked less well and his abdomen was greatly distended. The eumydrin was immediately discontinued, though no other signs of atropine poisoning were noted. The abdominal distension, together with complete cessation of vomiting and motions, continued in spite of all efforts to relieve it, and the child died three days later. Post mortem there was a definite pyloric tumour, but no other abnormality was present. The question of eumydrin poisoning in this case has been discussed under Toxic Symptoms.

One other child (Case 8) died after his discharge from hospital. Table II shows that (1) his response to eumydrin was negligible and he was operated on sixteen days after admission, and (2) after operation he remained in hospital a further six and a half weeks, during which he put on 1½ lb. His prolonged stay in hospital was thought advisable owing to the very poor home conditions. On discharge he appeared to be well and taking his feeds well. He was, however, readmitted five days later with a bronchopneumonia, from which he died in four days.

CONCLUSIONS

(1) Congenital pyloric stenosis responds to eumydrin, and many cases can be discharged from hospital within a fortnight or less. It is probable that, when dehydration and alkalosis are negligible—i.e., in those in which vomiting has been present for a few days only—hospitalisation will sometimes be unnecessary.

(2) Relief of dehydration and alkalosis before eumydrin is administered is of utmost importance if toxic symptoms are to be avoided. One case is described and others are alluded to in which it is believed that a paralytic ileus was induced through the use of repeated doses of eumydrin with insufficient parenteral fluid therapy.

(3) The relief of the obstruction is gradual, not sudden as in surgery, and the resumption to full feeds must be gradual. Stomach wash-outs for the first few days are beneficial in that accumulated

mucus and curds are removed. The use of breast-milk is, as always, of the greatest value.

(4) Occasional vomits are not incompatible with a satisfactory gain in weight, and, when they occur, immediate refeeding is almost always successful.

(5) The response to eumydrin is variable and apparently unpredictable. A few cases do not respond at all and can be recognised, and should be operated on, within a few days. Occasionally children in this series responded slowly, and hospitalisation was prolonged or they were readmitted. These cases could probably be recognised during the first week or ten days and should also be operated on. If the home conditions are considered unsatisfactory, or close supervision is not possible for the first week or two after discharge, a longer period in hospital will be necessary. When facilities for adequate protection against infection are lacking, such cases should be considered unsuitable for medical treatment. It is to be hoped that, with further work on this subject, it will be possible to recognise the type of patient suitable for medical treatment without the delay involved in the method of trial and error.

SUMMARY

(1) A series of 20 infants with pyloric stenosis treated with eumydrin is analysed, 16 being cured, 3 operated on successfully after eumydrin had failed to relieve the vomiting, and 1 dying during treatment with eumydrin.

(2) Diagnosis was made on a typical history, visible peristalsis, and a palpable pyloric tumour. Radiography, either as an aid to diagnosis or as an indication of response to treatment, was of doubtful value.

(3) Dehydration and alkalosis were relieved by the subcutaneous injection of normal saline, before eumydrin was administered, and was continued so long as daily fluid intake was insufficient.

(4) Gradually increasing doses of a 1 in 10,000 solution of eumydrin were given twenty minutes before each feed, beginning with 1 c.cm. and reaching 4–6 c.cm. per feed.

(5) Gradually increasing feeds (of breast-milk when possible) were given after an initial starve of twelve to eighteen hours, beginning with 2 drachms two-hourly and only reaching full feeds after three or four days.

(6) An initial, and thereafter daily, stomach wash-out was given until the residue had become negligible.

(7) Infants were discharged as soon as vomits were adequately controlled, and treatment was thereafter continued in the home. Eumydrin was discontinued by gradual diminution of the dose at the end of six to twelve weeks, depending on the initial response to the drug.

(8) Operation was performed in 2 cases in which vomiting was not controlled by eumydrin, and in one other who was discharged and readmitted and in whom response was inadequate.

(9) Transient flushing in one case receiving 8 c.cm. of eumydrin per feed was the only observed symptom of atropine-like poisoning. Persisting constipation may have been due to eumydrin, as may the condition of paralytic ileus, with subsequent death, in one child in whom the drug was administered before dehydration had been relieved.

I wish to express thanks to Dr. W. J. Pearson not only for permission to report the bulk of these cases but also for his help and advice both while the cases were being collected and in the preparation of this paper. In addition it must be recognised that the absence of serious infection in any case of the series is due to the care and coöperation of the nursing staffs of the University College, the Queen's, and the Princess Louise Hospitals.

REFERENCES

Braithwaite, J. V. (1938) *Brit. med. J.* **1**, 334.
Dobbs, R. H. (1937) *Proc. R. Soc. Med.* **30**, 1193.
Findlay, L. (1938a) *Brit. med. J.* **1**, 538.
— (1938b) *Arch. Dis. Childh.* **13**, 174.
Graham, S., and Morris, N. (1929) *Ibid*, **4**, 335.
Harris, C., and Keynes, G. (1937) *St Bart's Hosp. Rep.* **70**, 43.
Hartman, A., and Smyth, F. S. (1926) *Amer. J. Dis. Child.* **32**, 1.
Herzfeld, G., and Wallace, H. L. (1935) *Lancet*, **2**, 386.
Jewesbury, R. C., and Page, C. M. (1937) *St Thom. Hosp. Rep.* **2**, 141.
Levi, D. (1936) *Post-Grad. med. J.* **12**, 414.
Mackay, H. (1936) *Proc. R. Soc. Med.* **29**, 1210.
Maizels, M., McArthur, C. P., and Payne, W. W. (1930) *Lancet*, **1**, 286.
Svensgaard, E. (1935) *Arch. Dis. Childh.* **10**, 443.
Thompson, W. A., and Gaisford, W. F. (1935) *Brit. med. J.* **2**, 1037.
Wallace, H. L., and Wevill, L. B. (1934) *Ibid*, **1**, 1153.

A MEDIAL APPROACH TO THE MID-PALMAR SPACE AND ULNAR BURSA

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Adams McConnell—the first by many years, on this side of the Atlantic, to show practical appreciation of Kanavel's work—described in 1913 a method of draining the mid-palmar space. His dorsal incision of the web between the fingers, remote alike from vessels, nerves, and palmar skin, has never been bettered. It is part, however, of its charm that surgery leaves room for alternative procedures, and the one I shall describe here gives access to the ulnar bursa as well as to the mid-palmar space. Advantage is taken of a potential loop-hole in the edge of the hand by which it is possible to reach the deepest part of the palm. The incision, like McConnell's, leaves no palmar scar and is so placed that dependent drainage of space or bursa is got when the hand lies half pronated in the normal position of comfortable rest.

ANATOMY

The floor of the palm is formed by alternate bones and interosseous muscles covered with a loose carpet of fascia—a carpet that is separated from the ulnar bursa by the mid-palmar space. The bursa enfolds the superficial and deep flexor tendons of the middle, ring, and little fingers and almost completely fills the space.

The way in.—The opponens of the little finger, the deepest hypothenar muscle, lies on the ulnar side of the palmar floor concealed by the short flexor and the large bulge of the abductor. It is fastened proximally to the hook of the unciform and to the anterior annular ligament; distally, to the distal three-quarters of the fifth metacarpal shaft, on the ulnar side of the volar face (fig. 1). Between these attachments there is a small free portion of opponens belly. This free portion, when it has been artificially raised and displaced towards the palm, becomes the anterior boundary of a loop-hole that is framed behind by the fifth metacarpal base and the joint it makes with the unciform (fig. 2). An instrument passed through this loop-hole overcomes a check of variable resistance and then reaches the mid-palmar space.

The hypothenar fascia.—The check is caused by the most radial portion of the fascia that ensheathes the hypothenar muscles and loops them loosely, like a sling, to the shaft of the fifth metacarpal. The toughness of the membrane, and its erratic extensions to neighbouring bellies of interossei, vary in different persons.

The deep branch of the ulnar nerve with its satellite artery and veins must be carefully avoided. The branch leaves the main trunk opposite the pisiform and sinks gradually into the palm between the two superficial muscles of the hypothenar group—the abductor and the short flexor of the little finger. It enters the field of operation as it grazes the ulnar side of the unciform hook and is there bridged by opponens fibres. Just distal to the hook the nerve and vessels fortunately bend thumbwards almost at right angles, and, fortunately again, the bend lies a good finger-breadth radial to the loop-hole's mouth: it is thus avoided with certainty by directing the instrument in a distal direction—for choice, towards the head of the third metacarpal (fig. 1).

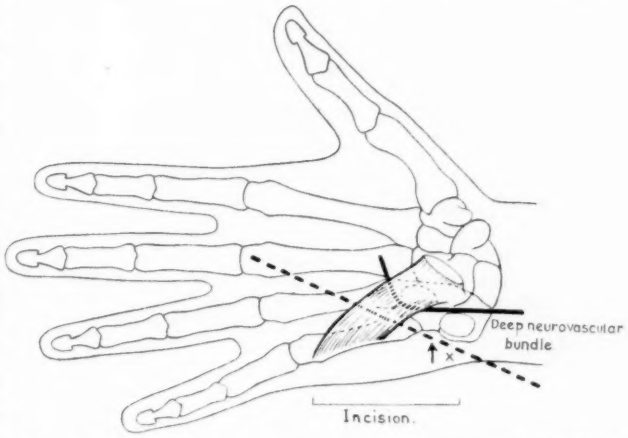

FIG. 1—The landmarks. X, the triquetral boss, from which the incision runs along the edge of the fifth metacarpal. The arrow points to the pit—just distal to the boss—in which is found the loop-hole between the opponens muscle and the bone (fig. 2). A forceps, aimed along the dotted line, would go through the loophole into the mid-palmar space avoiding and protecting the deep neurovascular bundle.

THE OPERATION

The site allows of a long incision, benignly placed, that gives every advantage for inspection and thorough drainage of a part where pus too easily pockets. Blind use therefore of the loop-hole as a means of access should be deprecated; it is merely a lucky breach that must be well widened for surgical attack.

Position.—With the patient recumbent under general anæsthesia, either pronate and turn his upper limb till the radial side of the hand rests on the table, or bring the half-pronated forearm into contact with the biceps. The first position has the merit of ulnar-flexing the hand and thus relaxing skin and muscle so that bony landmarks are easy to feel. At the moment, however, of making the incision the wrist should be propped straight to unwrinkle the skin.

The surface guide.—Slide a thumbnail down the ulnar border of the patient's *wrist*; a thumbs-breadth dorsal to the pisiform it will ride over a projecting boss—the cuneiform or os triquetrum—and then suddenly dip into a depression or pit distal to the boss (fig. 1). In this depression, which leads to the loop-hole, the nail touches the hard base of the fifth metacarpal immediately behind the hypothenar mass.*

The incision begins on the triquetral boss and goes—through skin only—down the whole length of the metacarpal edge; skin and fat are reflected just sufficiently to allow a view of the bone and of the fascia that covers the bulging abductor belly. Pick up this fascia close to the ulnar border of the bone; open it lengthwise without injuring the abductor; liberate and retract the muscle palmwards (fig. 2). Then pick up and divide a thin fascia just in front of the metacarpal base.

It is now easy to define the loop-hole (fig. 2) by raising the free portion of opponens from the bone

* Alternatively, if the nail slides proximally up the edge of the fifth metacarpal, the triquetral boss will bring it to rest opposite the pit.

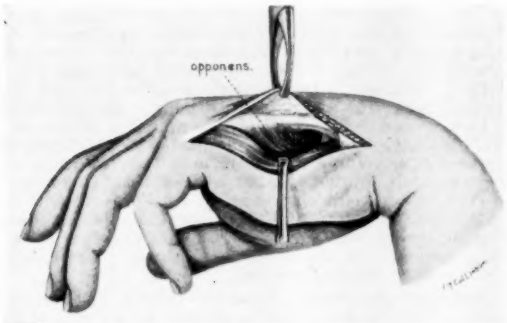

FIG. 2—The loop-hole. The abductor belly has been liberated and retracted after the fascia has been slit just in front of the metacarpal edge. Next, the deeper fascia in front of its base has been divided. Displacement of the free portion of the opponens palmwards then defines the loop-hole.

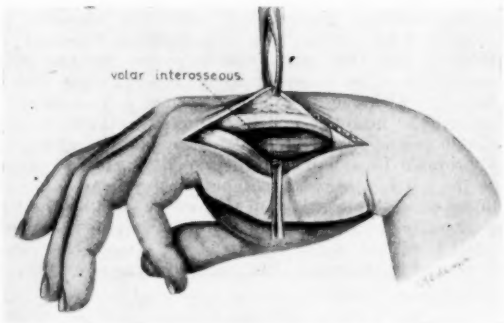

FIG. 3—The exposure. The loop-hole widened and the hypothenar fascia beyond opened, exposing the ulnar bursa in the mid-palmar space. The flexor tendons are seen through the bursa.

with the blunt nose of a Mayo scissors; withdraw and open the scissors, pass one blade through the loop-hole and cut the opponens insertion close to the metacarpal shaft, dividing all but the distal fibres; open the residual fascia beyond. The ulnar bursa will then be seen—through the wide gap between hypothenar mass and palmar floor—bulging into the mid-palmar space (fig. 3). Widen the gap still further by flexing the hand, especially its little finger. The deep neurovascular bundle can be protected during this operation with a closed forceps introduced three finger-breadths from the skin in the direction shown in fig. 1—a safeguard due to my colleague, Mr. R. Shackman.

The whole wound drains down in the position of normal rest, and the ultimate scar will escape pressure in any ordinary activity or posture.

REFERENCE

McConnell, A. A. (1913) *Med. Pr.* **95**, 328.

ESTIMATION OF SULPHANILAMIDE IN BIOLOGICAL FLUIDS

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In view of the extensive use of sulphanilamide (*p*-aminobenzenesulphonamide) and allied drugs it is desirable to have a method for their estimation in blood, urine, and other biological fluids which combines a reasonable degree of accuracy and sensitivity with simplicity of technique. Such a test would help the clinician to control the dosage, so as to maintain an optimal concentration in the blood and would facilitate study of the elimination of the drugs in the urine.

The only methods at present in use which are sufficiently sensitive are based on the diazotisation of the drugs and the coupling of the resulting diazonium salt with a suitable component to produce a highly coloured azo-dye. Fuller (1937) first tried β-naphthol as coupling agent, but the resulting colour was not sufficiently chromogenic. Marshall and his co-workers (1937a and b) reported the use of α-dimethylnaphthylamine as an acid coupling component, and later Scudi (1937) suggested a modification involving the use of chromotropic acid. There are, however, two disadvantages in these methods which hinder their extensive adoption in clinical work: first, the diazotisation reaction is tedious, for the conditions have to be carefully controlled so as to avoid secondary reactions which interfere with the development of the proper colour; secondly, neither α-dimethylnaphthylamine nor chromotropic acid is sufficiently stable or easily obtainable in a sufficient degree of purity to serve as a reliable clinical reagent. Moreover I have found that the intensity of the colour developed with α-dimethylnaphthylamine depends largely on the quality of the specimen used—an observation also discussed by Marshall (1937) and Stevens and Hughes (1938).

RATIONALE

The method now proposed has the accuracy and sensitivity of the diazotisation methods, is much less tedious to perform, and only involves the use of reliable clinical reagents. It is based on an original observation made during the routine examination of the urine of a patient undergoing treatment with sulphanilamide. In testing for urobilinogen with Ehrlich's reagent (*p*-dimethylaminobenzaldehyde) a copious orange precipitate was observed. Numerous specimens of urines from other patients receiving sulphanilamide were tested in a similar manner with Ehrlich's reagent, and an orange precipitate was obtained in all cases in which the sulphanilamide concentration was greater than about 0·1 per cent. With lower concentrations a deep yellow colour developed, followed in some cases by the slow formation of the orange precipitate. Since aqueous solutions of sulphanilamide behaved similarly with Ehrlich's reagent, it was clear that this reaction is due to the presence of this drug in the urine and therefore provides the basis of a ready method for the determination of sulphanilamide in biological fluids. Further preliminary experiments showed that the yellow colour was proportional in intensity to the concentration of sulphanilamide and sensitive to about 1 part in 500,000. It develops rapidly in urines diluted 1 in 100 or 1 in 200, at which dilution the normal constituents of urine do not in any way interfere with the development of the proper colour. The colour is also remarkably stable and very suitable for colorimetric analysis.

TECHNIQUES

The following techniques have been evolved for carrying out the estimation in blood and urine, and a close adherence to the prescribed conditions is necessary to ensure the most accurate and consistent results.

The *reagents* required are a solution of 3 g. of *p*-dimethylaminobenzaldehyde dissolved in 100 c.cm. of distilled water containing 7 c.cm. of concentrated sulphuric acid; a solution of 5 g. of trichloracetic acid in 100 c.cm. of distilled water; and solutions of N/4 sodium hydroxide and N hydrochloric acid.

Procedure for urine.—The urine is diluted with distilled water, so that the diluted solution contains 0·5–1·5 mg. of sulphanilamide per 100 c.cm. It is usually necessary to dilute the urine 1 in 100 or 1 in 200. To 9 c.cm. of this diluted urine 1 c.cm. of Ehrlich's reagent is added. The yellow colour develops immediately to its maximal intensity and is compared directly with the colour produced by treating standard solutions of sulphanilamide in distilled water in a similar manner with Ehrlich's reagent.

It has been shown that in man sulphanilamide is partly conjugated with acetic acid and eliminated as the acetyl derivative (Marshall, Cutting, and Emerson 1937). The sulphanilamide eliminated in this manner can be determined by the following procedure. Urine 1 c.cm. is placed in a test-tube with 2 c.cm. of N hydrochloric acid and heated in boiling water for about half an hour. The solution is then cooled, neutralised by the addition of 2 c.cm. of N sodium hydroxide, and diluted with distilled water to a volume of 10 c.cm. This solution is appropriately diluted 1 in 20 or 1 in 40, and to 9 c.cm. of this diluted solution 1 c.cm. of Ehrlich's reagent is added for the determination of total sulphanilamide. The difference between the total and the free gives the amount of acetylsulphanilamide eliminated (reckoned as sulphanilamide).

Procedure for blood.—Oxalated blood 1 c.cm. is added drop by drop from a pipette to 4 c.cm. of a 5 per cent. solution of trichloracetic acid. This precipitates the blood proteins as a coarse flocculent mass, which is easily filtered to yield a perfectly clear filtrate. Next, 2 c.cm. of the filtrate is measured into a graduated cylinder and diluted to 3·5 c.cm. with N/4 sodium hydroxide to neutralise the free

TABLE I—PREPARATION OF STANDARD SOLUTIONS FROM POTASSIUM CHROMATE

Dilution of 1 % solution	Equivalent concentration of sulphanilamide (mg. per 100 c.cm.)	Dilution of 1 % solution	Equivalent concentration of sulphanilamide (mg. per 100 c.cm.)
50 times	0·25	10 times	0·9
25 „	0·5	8·5 „	1·0
20 „	0·6	7·5 „	1·1
15 „	0·7	5 „	1·2
12·5 „	0·8	4·5 „	1·3

acid. Then 0·5 c.cm. of Ehrlich's reagent is added. The yellow colour developed is compared with the colour obtained with standard solutions of sulphanilamide in distilled water. It is necessary to neutralise the solution before adding the Ehrlich's reagent, because the presence of free trichloracetic acid interferes with the development of the yellow colour to its maximal intensity. The only modification necessary in the determination of total sulphanilamide—i.e., free plus conjugated—is to heat the 2 c.cm. of filtrate for thirty minutes in boiling water and to allow it

TABLE II—RECOVERY OF SULPHANILAMIDE AND ACETYLSULPHANILAMIDE ADDED TO URINE (MG. PER 100 C.CM.)

Added		Found	
Free	Acetyl	Free	Total
50	50	55	100
50	80	50	125
50	100	50	150
80	80	80	160
80	100	75	180
100	50	105	150
100	80	100	175
100	100	100	195

to cool before neutralisation and the addition of Ehrlich's reagent.

Colorimetric comparison.—For accurate work one of the usual types of colorimeter may be used, and the 1 mg. standard is conveniently set up at 20 mm. The development of colour is strictly proportional for the range of concentrations 0·25–1·5 mg. per 100 c.cm. In clinical work requiring only an accuracy of about 5 per cent. it is more convenient to use a

TABLE III—RECOVERY OF SULPHANILAMIDE ADDED TO BLOOD (MG. PER 100 C.CM.)

Added	Found	
	Human blood	Sheep's blood
5	5	4·5
8	8	8
10	9·5	10
15	15	14·5
20	20	19·5

simple comparator and a series of standard solutions corresponding to 0·25 mg., 0·5 mg., 0·6 mg., . . . up to 1·5 mg. of sulphanilamide per 100 c.cm. Such a permanent set of standards, whose colour is perfectly stable and unaffected by prolonged keeping, is obtained by diluting a 1 per cent. solution of potassium chromate as given in table I. The colours thus obtained match perfectly those given with sulphanilamide.

RESULTS

Recovery from urine.—The recovery of sulphanilamide and its acetyl derivative added in known amounts to urine is illustrated by table II. In all cases the recovery is quantitative.

Recovery from blood.—Sulphanilamide added in known amounts is recovered quantitatively from

TABLE IV—RECOVERY OF ACETYLSULPHANILAMIDE ADDED TO BLOOD

Acetylsulphanilamide added (mg. per 100 c.cm.)	Acetylsulphanilamide found			
	Dilution 1 in 5	Recovered (per cent.)	Dilution 1 in 10	Recovered (per cent.)
5	4·5	90	5	100
8	7	87	8	100
	6	75	8	100
10	8	80	10	100
	8·5	85	9·5	95
12	9·5	79	11·5	96
	9	75	12	100
15	11	74	14·5	96
	10·5	70	15	100

specimens of human and sheep's blood as shown in table III. Both in dilutions of 1 in 10 and 1 in 20 the amount of sulphanilamide adsorbed by the protein precipitate is negligible.

Marshall, Emerson, and Cutting (1937b) have reported the selective adsorption of acetylsulphanilamide on charcoal from urine, and therefore the possibility arises that in the protein precipitation some of the acetylsulphanilamide present in the blood

TABLE V—SUMMARY OF ANALYSES OF URINES OF PATIENTS RECEIVING SULPHANILAMIDE

Total dose		Average urine output (c.cm.)	Sulphanilamide			
			Free	Total	Total output (g.)	Elimination in urine (per cent.)
g.	Days		(mg. per 100 c.cm.)			
16	16	800	65	125	15	94
18	12	930	70	130	14·5	80
2·5	5	210	90	180	2	80
18	10	545	100	200	11	61
12	5	640	160	300	9·5	80
15	4	540	200	510	11·7	78
16	4	2150	60	110	10	62

may be adsorbed and so escape estimation. This point was investigated to ascertain the conditions under which this adsorption would be reduced to a minimum. It was found that if 0·5 c.cm. of blood is added to 4·5 c.cm. of the 5 per cent. solution of trichloracetic acid—i.e., dilution of 1 in 10 instead of the usual 1 in 5—the amount of adsorption is negligible. The actual results obtained are shown in table IV.

To illustrate the elimination of sulphanilamide in the urine table V contains a summary of the analyses of urines of patients receiving this drug. It will be noticed that on the average half the sulphanilamide is eliminated free and half in the

conjugated form as the acetyl derivative. Hence in most cases it is unnecessary to hydrolyse the acetyl derivative to determine the total elimination of the drug, for an approximate figure is obtained by multiplying the concentration of free sulphanilamide by two.

In table VI are collected the results of typical analyses of the blood of patients receiving sulphanilamide or M. & B. 693. The routine dosage was one tablet (0·5 g.) three times a day or once every four hours. The blood samples were taken a specified time after the indicated dose to study the variation of drug concentration in the blood with time.

TABLE VI—RESULTS OF BLOOD ANALYSES OF PATIENTS RECEIVING SULPHANILAMIDE OR M. & B. 693

Last dose (g.)	Interval after dose (hours)	Content of drug in blood (mg. per 100 c.cm.) Free		Total	
		Before dose	After dose	Before dose	After dose
1	2	2·5	6	5	9·5
	3	—	3·5	—	5
0·5	2	2·5	4	5	8
	3½	—	2·5	—	5
1	1	0	2	0	3
	2½	—	3	—	4·5
	5	—	2	—	3
0·5	2	2	4	4	7
	3½	—	2·5	—	4·5
1	2	5	7	9	11

In all these cases both the dosage and the concentration of the drug in the blood are smaller than the figures given by Long and Bliss (1937a and b), who believe that the desired concentration in the blood should be 10 mg. per 100 c.cm. and attain this by an initial dose of 1·5–2·0 g., followed by 1 g. every four hours. The figures in table VI suggest that the therapeutically active concentration of the drug is lower, although this remains to be established.

CONCLUSION

The method outlined for the estimation of sulphanilamide and its acetyl derivative in blood and urine yields highly satisfactory results; it is highly accurate and sensitive and is very suitable for clinical purposes. It has two very important advantages over the diazotisation methods: (1) its much greater simplicity in technique, which results in a considerable saving of time in carrying out the estimation, and (2) the use of only reliable reagents long familiar to clinical chemistry. It thus places in the hands of the clinician a ready means of controlling the concentration of sulphanilamide and allied drugs in the blood and of studying their elimination in the urine, a point which is of particular importance in cases of urinary infections treated with sulphanilamide or similar drugs.

The method can also be directly applied to the estimation of two derivatives of sulphanilamide that have recently been introduced as chemotherapeutic agents—namely, M. & B. 693 (2-sulphanilylaminopyridine) and Uliron (4′-dimethylaminosulphamido-4-aminobenzenesulphonamide). Under the conditions described both these substances react with Ehrlich's reagent to produce a deep yellow colour suitable for colorimetric analysis. The reaction is of the same degree of accuracy and sensitivity as with sulphanilamide itself. The same chromate standards can be used as in the estimation of sulphanilamide if small correction factors are used to allow for the differences in molecular weight of the substances.

The exact nature of the substance formed in this reaction has not yet been definitely established; by allowing equimolecular amounts of sulphanilamide and Ehrlich's reagent to react in acid solution the orange precipitate formed can be recrystallised from hot water and obtained in the form of dark red needles with a melting-point of 244° C. and with the empirical formula $C_{15}H_{16}O_4N_2S$.

I wish to thank Dr. A. Parsons and Dr. R. A. Q. O'Meara for many helpful suggestions and to express my indebtedness to Dr. C. J. McSweeney and Dr. W. J. Roche of Cork Street Fever Hospital, Dublin, for providing samples of blood for analysis.

REFERENCES

Fuller, A. T. (1937) *Lancet*, **1**, 194.
Long, P. H., and Bliss, E. A. (1937a) *J. Amer. med. Ass.* **108**, 32.
— — (1937b) *Sth. med. J., Nashville*, **30**, 479.
Marshall, E. K., Jr. (1937) *J. biol. Chem.* **122**, 263.
— Cutting, W. C., and Emerson, K., Jr. (1937) *Science*, **85**, 202.
— Emerson, K., Jr., and Cutting, W. C. (1937a) *J. Amer. med. Ass.* **108**, 953.
— — — (1937b) *J. Pharmacol.* **61**, 191.
Scudi, J. V. (1937) *J. biol. Chem.* **122**, 539.
Stevens, A. N., and Hughes, E. J. (1938) *J. Amer. pharm. Ass.* **27**, 36.

INTERFERENCE DISSOCIATION

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THE term "interference dissociation" was introduced by Mobitz (1923) to explain a condition in which the auricles and ventricles seem to be acting independently, and yet the ventricular rhythm is interrupted at intervals by early beats arising in response to stimuli from the auricle.

The cause of this apparent anomaly is a nodal rhythm at an unusually fast rate with a complete retrograde heart-block. None of the nodal impulses reach back to the auricles, which beat undisturbed to the slower sinu-auricular rhythm; so the P waves are upright. This is in contradistinction to reciprocal rhythm, in which there is a partial retrograde heart-block and the auricles contract in response to stimuli conducted back from the node, and so the P waves are inverted. But, as in reciprocal rhythm, there is no obstruction to forward conduction, though the time taken by the impulse may be prolonged; and, if a P wave arrives at a suitable moment, the ventricles will respond with an early beat. The number of early beats depends on the relative rates of the auricles and ventricles. If the P wave arrives much before the end of T, the ventricle may have already responded to the next nodal beat, or the prematurity will be so slight as to be doubtful. The fact that the ventricular complexes are faster than the auricular, as well as the early beats, distinguishes interference dissociation from complete heart-block.

In the case to be described the patient passed successively through phases of interference dissociation, auricular fibrillation, reciprocal rhythm, nodal rhythm, and partial heart-block, so that the nature of the arrhythmia is clearly demonstrated.

CASE RECORD

A man aged 25 was admitted to the Harrogate General Hospital on Feb. 24, 1938, with a two days'

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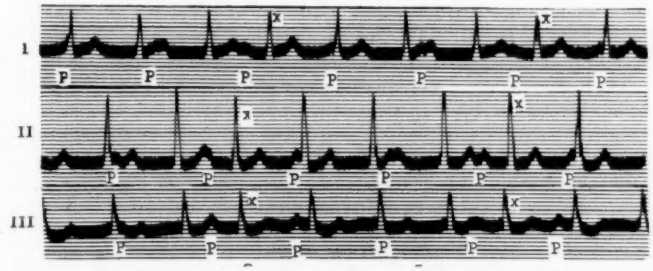

FIG. 1—Interference dissociation. Note upright P waves at rate of 86 and upright T waves at 114. Early ventricular beats marked x occur every fourth beat.

2

FIG. 2—Auricular fibrillation.

history of rheumatic fever following a sore-throat a week previously. He had polyarthritis. The temperature was 102° F. The tonsils were enlarged and septic. The heart was not enlarged; the sounds were evenly spaced, and premature beats without a compensatory pause were present. There were no murmurs. An electrocardiogram (fig. 1) showed dissociation of the auricular and ventricular rhythms, the ventricular rate being 114, the auricular 86. The P waves are upright. Early ventricular beats occur at every fourth beat and always follow a P wave which falls on or about the preceding T. The P–R interval of these beats is about 0·22 sec.

The patient was given sodium salicylate gr. 120 daily, and in two days the temperature was normal. Serial electrocardiograms showed the following changes. Fig. 2 (Feb. 25, 1938): auricular fibrillation. The T waves are diphasic in lead II; in lead III they are inverted. Fig. 3 (Feb. 26, 1938) shows interference dissociation at a slower speed, the temperature by now being normal. The auricular rate is 64, the ventricular 100. The early beats are clearly seen at every fourth beat with a P–R interval of 0·22 sec. The T wave in lead I is now inverted. In lead II P waves are apparent only when they occur during the S–T period. This patient was liable to have nearly iso-electric P waves in lead II (fig. 7), and auricular deflections, as in fig. 2, show better when superimposed on T waves.

An electrocardiogram taken on the same day (fig. 4) shows the transition from complete to partial retrograde heart-block. The first complex in lead II has the upright P of dissociation in the S–T interval. The second has the inverted P of partial retrograde heart-block, the Q–P interval being 0·24 sec. The third complex has the same Q–P interval, and the P is answered by the next ventricular complex, which is early (reciprocal rhythm). The rhythm then reverts to dissociation, and in the next complex P slurs the upstroke and downstroke of R; and in the last an upright P occurs just after R. Lead III shows a regular nodal rhythm at a rate of 75, the Q–P interval being 0·08 sec.

Fig. 5 (Feb. 27, 1938) shows nodal rhythm. The

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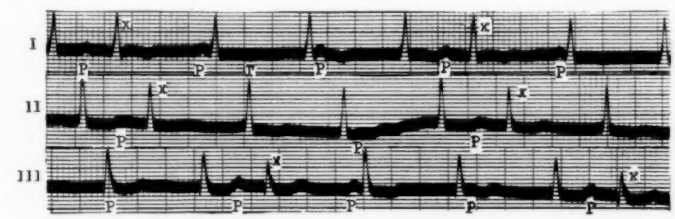

FIG. 3—Interference dissociation. V = 100. A = 64. Early beats are seen clearly when P and T summate. In lead II P waves are only apparent when P is superimposed on T. In lead I T is inverted.

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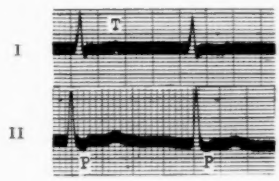

FIG. 5—Nodal rhythm. T in lead I is just upright.

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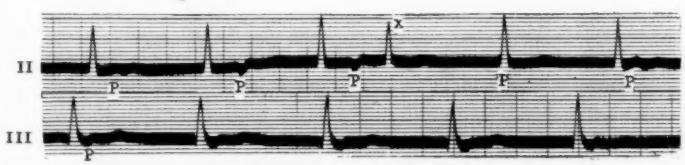

FIG. 4—Upper strip (lead II) V 1 shows dissociation with upright P in the S–T interval. V 2 shows partial retrograde heart-block with inverted P (Q–P 0·24 sec.). V 3 shows a similar Q–P time. This P is answered by V 4 (marked x), reciprocal rhythm. V 5 and V 6 show dissociation with P 5 slurring R 5 and P 6 following R 6. Lower strip (lead III) shows nodal rhythm at 75.

6

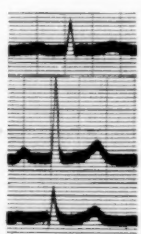

FIG. 6—Partial heart-block. P–R 0·26 sec.

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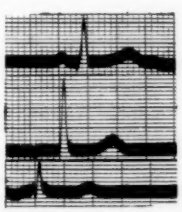

FIG. 7—Normal. Note small diphasic P in lead II.

T wave in lead I is now just upright. Fig. 6 (March 3, 1938) shows partial heart-block with a P–R of 0·26 sec. Fig. 7 (March 11, 1938) shows normal rhythm; the P waves in lead II are small and diphasic.

No valve lesion developed. The tonsils were removed on April 11, 1938. The patient made an uninterrupted recovery. At no time did he receive digitalis.

DISCUSSION

Transitory interference dissociation at relatively slow speeds may arise from various causes, though rheumatic infection is important among them (Cutts 1937). Regularly recurring cycles of interference beats with fast ventricular rates have only been recorded in young people with severe infections associated with fever. The first example with a cycle of seven beats was published by White (1916) under another title in a woman of 24 with a peritonsillar abscess. Other instances have been recorded in rheumatic fever by Oettinger and Neslin (1932, Case 5) in a youth of 19, with a cycle of five beats, and by Cutts (1937, Case 5) in a man of 21, with a cycle of two beats; in pneumonia by Mobitz (1923) in a girl of 19, with a cycle of five beats; and in typhoid by Geraudel (1932) in a boy of 11, with a cycle of six beats.

The temporary inversion of the T wave with auricular fibrillation in the patient here described are evidence of a generalised cardiac infection. The later recovery phases of reciprocal rhythm and nodal rhythm support the idea of depression of conductivity in the auricle combined with a primary depression of excitability in the sinu-auricular node as the cause of interference dissociation.

SUMMARY

A case of interference dissociation is described in a patient with rheumatic fever, who passed later through phases of auricular fibrillation, reciprocal rhythm, nodal rhythm, and partial heart-block to normal.

The mechanism and ætiology of the arrhythmia are discussed.

REFERENCES

Cutts, F. B. (1937) *Amer. Heart J.* **13**, 451.
Geraudel, E. (1932) *Arch. Mal. Cœur*, **25**, 339.
Mobitz, W. (1923) *Dtsch. Arch. klin. Med.* **141**, 257.
Oettinger, I., and Neslin, W. (1932) *Ibid*, **173**, 212.
White, P. D. (1916) *Arch. intern. Med.* **18**, 244.

GOUT FOLLOWING SALYRGAN DIURESIS *

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ALTHOUGH mentioned by Hench (1936) the occurrence of gout after the use of Salyrgan for the relief of œdema in congestive heart failure does not appear to be widely recognised. Five such cases are described in this paper, and the fact that they were observed within a period of little more than a year suggests that the association cannot be so very uncommon. A possible bearing on certain aspects of pathogenesis, which is discussed later, is an added reason for recording them.

* A résumé of the case reports was read to the International Conference on Rheumatic Diseases at Bath on April 1, 1938.

In all five cases salyrgan was given intramuscularly in doses of 1 c.cm. on alternate days and supplemented by ammonium chloride gr. 20 three times a day by mouth. All the patients were kept strictly at rest and on a reduced fluid intake.

CASE RECORDS

CASE 1.—A man, aged 79, had arterio-sclerotic heart failure with auricular fibrillation and considerable œdema. The exhibition of salyrgan was followed by a brisk diuresis, which reached a "critical" level of 4 pints 13 oz. on the ninth day, with great reduction in œdema. On the following day a red, œdematous, and acutely tender area developed on the ulnar aspect of the right wrist and hand, which cleared up with colchicum. There was a tophus in the right ear and tophaceous deposits in the left olecranon bursa, which later became the seat of an acute gouty inflammation. The patient gave a history of typical gout in the great toe on several previous occasions, but not recently. Radiograms of the hands showed characteristic gouty changes in the phalanges and metacarpals. The blood uric acid measured when the height of the attack had passed was 3·13 mg. per 100 c.cm.

This patient died six weeks after the appearance of the gout, with return of œdema and increasing signs of failure.

CASE 2.—A man, aged 62, had hypertensive heart failure with bundle-branch block and considerable œdema. Salyrgan produced a very brisk diuresis reaching a maximum of five pints on the seventh day and six pints on the eighth day with great reduction in the œdema. On the ninth day this patient developed typical acute gout in the right great toe and on the dorsum of the right foot. He gave a history of recurrent gout over a period of twenty years and a strong family history.

The blood uric acid at the height of the attack measured 4·7 mg. per 100 c.cm., and at this time the uric acid in the œdema fluid was 6·2 mg. per 100 c.cm. Subsequently with increasing signs of heart failure the blood uric acid rose to 8 mg. and the œdema fluid uric acid to 10 mg. Despite the high uric acid levels in blood and tissue fluid during the later stages, there was no return of acute gout. The patient died in a waterlogged condition three weeks after the appearance of gout.

CASE 3.—A man, aged 64, who had hypertensive heart failure with œdema, developed acute gout in both great toes five months after admission to hospital, and after rather prolonged treatment with salyrgan and ammonium chloride. He gave a history of several previous attacks, the last of them seven years ago. The largest 24-hour urinary output recorded during treatment in hospital (4 pints) occurred three days before the onset of the gout. His condition deteriorated rapidly after the gouty attack and he died one week later.

CASE 4.—A man, aged 42, had congestive heart failure secondary to syphilitic aortitis. Wassermann reaction ++. There was a history of gout in the left great toe two years ago. In addition to salyrgan and ammonium chloride this patient also received potassium iodide in doses up to 30 grains three times a day and injections of bismuth. There was a good diuresis reaching a maximum of nearly 5 pints on the ninth day after commencement of treatment. On the day following this he developed acute gout in the left great toe. There was a second attack two weeks later, when the blood uric acid measured 3·7 mg. per 100 c.cm. He died six weeks after the first attack of gout.

CASE 5.—A man, aged 73, had moderate congestive failure with auricular fibrillation. There was only slight œdema on admission, but this became much more pronounced later, following symptoms of an acute coronary occlusion. The patient was given a

few injections of salyrgan on admission and this was then discontinued. Later salyrgan was resumed on account of increasing œdema. Nine days after commencement of the second course of salyrgan, and following an exceptional 24-hour diuresis, acute gout developed in the right great toe. The patient gave a history of probable gout two to three years previously. He went out of hospital against advice five weeks after the appearance of the gout and died ten days later.

COMMENT

The following features are common to all these cases:

(1) All had previous histories of gout.

(2) The attacks were always immediately preceded by a "critical" diuresis, which in four out of five cases occurred 7–9 days after commencement of salyrgan therapy.

(3) The height of the blood or œdema fluid uric acid did not appear to be of primary importance in determining the onset of gout. This was well brought out in estimations of blood and œdema fluid uric acid in Case 2. In certain other cases of cardiac failure which were studied it was not uncommon to find blood uric acid figures as high as 10 mg. per 100 c.cm. prior to death; yet these patients did not at any time develop gout. The two factors essential for the development of the attack appeared to be a previous history of gout and a very brisk diuresis in response to salyrgan.

(4) The onset of gout following the use of salyrgan in cardiac failure is of grave prognostic significance. It seems to be usual for patients to succumb within a few weeks of the attack. It may be that gout only develops after forced diuresis in patients in the terminal stages of cardiac failure, or gout may have some deleterious effect on the cardiac condition. This raises the question of the desirability of using mercurial diuretics like salyrgan in patients giving a history of gout, since it seems possible that too successful a diuresis may be dangerous.

DISCUSSION

The sequence of a copious diuresis followed by an acute gouty attack formed a remarkably constant event in this series. The idea that such diuresis acts by a mere mechanical concentration of uric acid in the tissues must be dismissed. Serial estimations of uric acid in the œdema fluid in Case 2 and in certain other non-gouty cases of congestive heart failure treated with salyrgan demonstrated conclusively that salyrgan diuresis produces an absolute reduction in uric acid concentration in the tissue spaces. In other words, when œdema is maximal, uric acid concentration is also maximal, and vice versa.

I suggest that this preliminary diuresis is of critical significance in salyrgan-induced gout. The fact that the ordinary or "spontaneous" attack of gout is also preceded by a diuresis seems in recent years to have been overlooked although noted as a clinical observation by Scudamore as long ago as 1816, by Fothergill (1883), and by Duckworth (1890). Most modern descriptions of the disease emphasise the scantiness of the urinary output throughout the attack. The explanation possibly lies in the transient nature of the diuresis, and in the fact that it is immediately followed by a marked urinary diminution at a time which coincides with the appearance of the acute signs of inflammation. The reality and importance of this prodromal diuretic phase in the gouty cycle have been emphasised by Talbot, Jacobson, and Oberg (1935), and more recently by Talbot and Coombs (1938), in a careful quantitative study of the water and mineral exchange in acute gout. These workers have shown that in a typical attack the first event is an increase in urinary fluid output together with a greatly increased excretion of electrolytes, especially sodium and potassium, chloride, phosphate, and urate. The most striking feature appears to be the mobilisation and increased excretion of sodium chloride and water which precedes the appearance of gouty inflammation of joints or tissues by one or more days.

In view of these observations the nature of the diuresis effected by salyrgan in the œdematous subject assumes considerable interest. Fortunately, the results of several intensive investigations of this question are already available (Herrmann et al. 1932, 1933, Bryan et al. 1935, Stockton 1936), and, although there is evident divergence of opinion as to the site of action of salyrgan, there is a general agreement that the result of salyrgan activity is a greatly increased excretion of water and body electrolytes. Particularly remarkable is the enormous output of water and sodium chloride, in which the mercurials far outstrip digitalis or drugs of the purine group.

Thus it appears that the "critical" diuresis achieved by salyrgan closely parallels a "critical" diuresis preceding the ordinary attack of gout. There is, of course, a quantitative difference in terms of urinary fluid output, but from the figures of Talbot and his co-workers it is evident that there are wide variations in urinary mineral concentration in the prodromal phase of spontaneous gout, implying a coincident disturbance in body electrolytes, almost as profound as that induced by salyrgan in the œdematous subject.

If factors are to be sought common both to the spontaneous and to these artificially induced attacks, attention should surely be directed to this prodromal disturbance in electrolyte balance. Many vital aspects of the problem of gout are still shrouded in uncertainty, and it may well be that their ultimate solution lies here rather than in the restricted terrain of uric acid metabolism.

SUMMARY

(1) Five cases of congestive cardiac failure are described in which attacks of gout followed diuresis produced by salyrgan.

(2) All five cases gave a history of previous gout.

(3) The development of gout in a patient receiving salyrgan indicates a bad prognosis.

(4) The attacks of gout appear to be due to the diuresis rather than to the level of the blood uric acid, and it is suggested that the associated disturbance of electrolyte balance is of considerable importance in their causation.

Four of the five cases were admitted to Southmead Hospital under the immediate care of Prof. Bruce Perry, whom I have to thank for much valuable criticism and advice.

REFERENCES

Bryan, A. H., Evans, W. A., Fulton, M. N., and Stead, E. A., Jr. (1935) *Arch. intern. Med.* **55**, 735.
Duckworth, D. (1890) A Treatise on Gout, London.
Fothergill, J. M. (1883) Gout in its Protean Aspects, London.
Hench, P. S. (1936) *J. Lab. clin. Med.* **22**, 48.
Herrmann, G., Stone, C. T., and Schwab, E. H. (1932) *Trans. Ass. Amer. Phys.* **47**, 279.
— Schwab, E. H., Alvarez, J. A., and Cate, M. E. (1933) *Proc. Soc. exp. Biol., N.Y.* **30**, 1375.
Scudamore, C. (1816) A Treatise on the Nature and Cure of Gout, London.
Stockton, A. B. (1936) *Arch. intern. Med.* **58**, 891.
Talbot, J. H., and Coombs, F. S. (1938) *J. Amer. med. Ass.* **110**, 1978.
— Jacobson, B. M., and Oberg, S. A. (1935) *J. clin. Invest.* **14**, 411.

CLINICAL AND LABORATORY NOTES

POLIOMYELITIS TREATED BY TILTING STRETCHER

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In view of the widespread interest in the Both or Drinker respirator and other types of resuscitation apparatus, I think it may be useful to give an account of a case of poliomyelitis which was treated by my colleagues when I was on leave.

A boy aged 9 was admitted to the Grimsby Corporation Hospital on August 13, 1938, with extensive paresis of arms, legs, and abdominal muscles. The onset was on August 6 with malaise, headache, and vomiting, and the onset of paralysis on the day of admission. There was no history of contact with a known case.

On admission the deep reflexes were absent and the plantar reflexes flexor, the abdominal reflexes were absent, and the patient was unable to sit up or flex his neck. The diagnosis was obvious, but was confirmed by the findings of the cerebrospinal fluid, which were as follows:—

Cells	Nearly 200 mononuclears per c.mm.
Protein	75 mg. per 100 c.cm.
Globulin	Trace.
Wassermann reaction ..	Negative.
Lange curve	0 0 0 3 4 1 0 0 0 0.

On August 16 the legs were put up in plaster. On the 19th all the intercostal muscles on both sides became paralysed and there was weakness of the left leaf of the diaphragm, which rapidly led to dyspnœa and cyanosis. In anticipation of such an emergency a stretcher had been fitted on a tilter apparatus supplied by the Tor Equipment Co., Ltd., Croydon. This was based on the principle of the rocking method of resuscitation described by Dr. F. C. Eve of Hull. The boy was at once placed on this stretcher and rocking was commenced and dyspnœa and cyanosis were relieved within ten minutes.

As no motor apparatus was available the boy was swung continuously for five days at the rate of 12 rockings per minute, and during this period the intercostals and diaphragms gradually resumed function. The angle through which the stretcher was swung was about 35° from the horizontal on either side. On the fifth day the tilting was discontinued for twenty minutes every two hours, and the time of stopping was increased each day until on the eighth day he was being swung for twenty minutes every two hours. On the ninth day (August 27) he was permanently removed from the stretcher.

Two points of exceptional interest were the relative ease of nursing as compared with other types of resuscitation apparatus, and the patient's mental reactions to the treatment. The boy fortunately had no pharyngeal paresis while on the stretcher and was on relatively full diet, his appetite being exceptionally good. His diet was roughly as follows: for breakfast he had bacon and tomato; for dinner, chicken and potato; and for tea, jelly, bread, and butter. Besides these he had fruit and adequate fluids during the day.

Tilting was stopped for feeding in the horizontal position. For washing and changing he was stopped for as much as thirty minutes, and for bed-pans five minutes. While on the stretcher he had full sphincter control and had a daily motion, but increasing constipation necessitated an enema on the fifth day, for which the rocking was stopped for half an hour.

The boy's mental reactions were interesting. For the first two hours his anxiety was divided by the fact that "he could not get his breath" while not being swung, and the fact that the swinging tended to give rise to nausea. This latter proved to be transient and after the first two hours, when he was stopped for general attention, he cried to be swung again as there was so much relief to his respiratory embarrassment while swinging.

On Sept. 6 his arms also were put into plaster in a state of abduction, and two days later there was a sudden alarming onset of tachycardia. As there was no cardiac enlargement, a diagnosis of loss of vagal control, rather than myocarditis, was made. This temporary phase passed off and as soon as the international situation settled down he was transferred on Oct. 14 to the orthopædic annexe of the Grimsby and District Hospital. Later, on Dec. 5, in view of the better educational facilities there, he was again transferred to the Harlow Wood Orthopædic Hospital, where he is now making slow and steady progress towards recovery.

In the opinion of my colleagues there is no doubt that this boy would have died had it not been for the use of this tilting stretcher, and that it was the most suitable type of resuscitation apparatus for this particular case, the ease of nursing over such a long period being remarkable. No record can be traced of any similar type of respiratory paralysis requiring such prolonged treatment, and surviving.

EXAMINATION OF SMALL QUANTITIES OF URINE

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Most urine tests are based on the assumption that an ample supply is available for examination, and the usual clinical tests are not always suitable when the supply of urine is restricted. This is particularly true of the methods of estimating urea, most of which require 1–4 c.cm. of urine. Just as accurate results can be obtained with much smaller quantities, and the object of this paper is to describe a method whereby urea may be estimated in only 0·1 c.cm. of urine. This is useful for the examination of small quantities of urine collected by catheterisation of the ureters and for the analysis of small quantities of discharges to decide whether or not these contain urine. A brief description will also be given of a way in which it is possible, with 0·5 c.cm. of urine, to carry out a fairly thorough examination, including not only the quantitative estimation of urea but also estimation of specific gravity, microscopic examination for blood, pus, casts, and crystals, and bacteriological tests.

ESTIMATION OF UREA IN 0·1 C.CM. OF URINE

The urea is estimated by the hypobromite method, the gas being collected and measured in a Van Slyke volumetric gas apparatus or in the Fowweather modification (in which the two-way chamber below the stopcock is replaced by a bulb). Both these pieces of apparatus are familiar to laboratory workers and so need not be described in detail. The reagents for the hypobromite mixture are (1) bromine solution prepared by dissolving 60 g. of potassium bromide in 100 c.cm. of water and adding 2·5 c.cm. of bromine, and (2) a 40 per cent. solution of sodium hydroxide. These solutions are kept separately in stoppered bottles. For each urine test 0·75 c.cm. of the bromine solution is mixed with 1·25 c.cm. of sodium hydroxide.

In carrying out the urine test the chamber of the Van Slyke (or Fowweather) apparatus is first filled

with mercury completely, including the channels in the two-way stopcock above. About 1 c.cm. of water is run into the cup and 0·1 c.cm. of urine measured accurately with a teated blood pipette and mixed with the water in the cup. This diluted urine is admitted into the chamber by turning the upper stopcock and the cup washed out with a few drops of water and this also admitted. Finally the 2 c.cm. of freshly prepared alkaline hypobromite is pipetted into the cup and run into the chamber. No bubbles of air must be allowed to enter with these liquids.

The lower stopcock is now closed and the apparatus taken from the stand and inverted to mix the contents. It is then replaced in the stand, the lower stopcock opened, and the levelling bulb lowered so as to reduce the pressure. This causes a rapid liberation of nitrogen from the urea. While the levelling bulb is still lowered, the stopcock beneath the chamber is closed so as to maintain the reduced pressure and the whole apparatus shaken for about half a minute. It is then returned to the stand, the lower stopcock opened once again, and the pressure within the apparatus adjusted to that of the atmosphere by moving the levelling bulb until the mercury stands at the same height in this and in the chamber. The lower stopcock is now closed once more and the apparatus shaken once again for half a minute. The object of this second shaking is to redissolve any gases other than nitrogen which have been liberated during the previous reduction in pressure. Finally the apparatus is replaced in the stand, the level of the mercury in the chamber and levelling bulb once more set at the same height, and the volume of gas read from the scale.

Calculation.—When 0·1 c.cm. of urine has been taken for analysis, the volume of gas evolved multiplied by 2·8 expresses the urea in the urine as grammes per cent.

Example

Gas evolved, 0·5 c.cm.
Then urine urea = 1·4 per cent.

Explanation of formula.—Experiment has shown that with this method 1 g. of urea evolves 357 c.cm. of N (not the theoretical value of 373 c.cm.).

Since 357 c.cm. of N is derived from 1 g. urea, then

$$x \quad \text{"} \quad \text{"} \quad \text{"} \quad \frac{1}{357} \times \frac{x}{1} \text{ g. urea.}$$

(Where x represents the c.cm. of N found to be evolved from the 0·1 c.cm. of urine.)

If 0·1 c.cm. of urine contained $\frac{1}{357} \times \frac{x}{1}$ g. urea, then

$$100 \quad \text{"} \quad \text{"} \quad \text{"} \quad \frac{1000}{357} \times \frac{x}{1} \text{ g. urea}$$

$$= 2{\cdot}80168\ x \text{ g. urea.}$$

For practical purposes this may be accepted as $2{\cdot}8\ x$.

This method of estimating the urea in urine has been in constant use at St. Peter's Hospital for Stone for the last ten years and has proved to be the quickest and most reliable of several methods tried. Miss Douglas, research assistant at the hospital, has recently carried out a long series of comparisons with other methods for the purpose of testing its accuracy. Duplicate tests were undertaken on more than 140 specimens of urine with the hypobromite method and three different urease methods, and the results were found to correspond very closely. The urease methods chosen for comparison were (1) Cole's method (1937) and two modifications, (2) the direct Nesslerisation method described by Taylor, Hayes, and Wells (1937), and (3) Conway's micro method (1933). The correspondence was not exact but sufficiently close for clinical purposes. If, for instance, the exact amount of urea in urine was 2 per cent., all methods gave approximately the same result, but if the urea percentage was high—say about 3—it was generally found that Cole's method and the Nesslerisation technique gave readings of about 2·9 and the hypobromite method about 3·1 per cent. The fact that with very concentrated urine the reading with the hypobromite method may be a decimal point or two higher than the correct figure—e.g., 3·5 or 3·6 instead of 3·4—is not a serious disadvantage. Such a slight inaccuracy as this is of no importance in the examination of ureteric catheter specimens, when the main object of the test is to ascertain whether each kidney is able to excrete a concentrated urine and to make a comparison of the concentration of urea in the urine from each ureter. For this purpose the hypobromite method described is thoroughly reliable and uses up only 0·1 c.cm. of each urine.

OTHER LABORATORY TESTS ON SMALL QUANTITIES OF URINE

Specific gravity.—The best method of estimating the specific gravity in ureteric catheter specimens is to weigh the urine in a small specific-gravity bottle, but at least 5 c.cm. is required for this test alone. If only smaller quantities than this are available, the specific gravity may be estimated by preparing a mixture of carbon tetrachloride and xylol, adding a drop of urine, and noticing whether this sinks or floats. Carbon tetrachloride or xylol is added until the drop remains suspended half-way. The specific gravity of the mixture is then taken with a hydrometer. Thorough mixing is essential before each addition.

Microscopical examination.—The best method of examining for pus, blood, casts, and crystals is to use a cerebrospinal fluid counting chamber (Fuchs-Rosenthal or similar pattern with a space of 0·2 mm. between the coverslip and platform). This is particularly suitable for the detection of pus in ureteric catheter specimens and for accurate comparison of the number of leucocytes in the urine from each kidney. A few leucocytes and epithelial cells are always found in ureteric catheter specimens. Urine may be said to contain a few pus cells or an excess of leucocytes if there are between 10 and 100 leucocytes per cubic millimetre and "large quantity of pus" when the cells number more than 500 (Dukes 1928).

Bacteriological tests.—Films may be made by evaporating a thick drop of urine on a microscope slide, keeping the drop confined to small limits by placing it within a circle marked by a glass writing pencil. Bacteriological cultures are made by spreading another drop of the urine over culture media.

ORDER OF PROCEDURE RECOMMENDED IN ROUTINE EXAMINATION

The following is the order of procedure recommended for examination of 0·5 c.cm. of urine obtained by catheterisation of ureters. Each of the following five tests can be carried out on 0·1 c.cm.

(1) Take a sterile pipette and transfer one drop of urine to culture media.

(2) With the same pipette place another drop of urine (approximately 0·1 c.cm.) within a circle on a slide and leave this to dry on a microscope lamp or in the incubator.

(3) With the same pipette run a drop of urine into the counting chamber (C.S.F. pattern) for microscopical examination for blood, pus, casts, and crystals.

(4) Measure accurately 0·1 c.cm. of urine with a blood-sugar pipette and use this for estimating urea by the hypobromite method described.

(5) The remainder of the urine may be used for the specific-gravity test if so desired. It is difficult to measure the specific gravity accurately by the carbon tetrachloride and xylol method, and in most cases the last few drops of urine would be better

spent in repeating the urea estimation or providing a more generous portion for culture.

I am grateful to Miss Hilda Douglas, M.Sc., for carrying out the control tests on the hypobromite method.

REFERENCES

Cole, S. W. (1937) *Lancet*, **2**, 575.
Conway, E. J. (1933) *Biochem. J.* **27**, 430.
Dukes, C. E. (1928) *Brit. med. J.* **1**, 391.
Taylor, W. F., Hayes, E. R., and Wells, B. B. (1937) *J. Lab. clin. Med.* **23**, 188.

GRANULOMA VENEREUM TREATED WITH M. & B. 693

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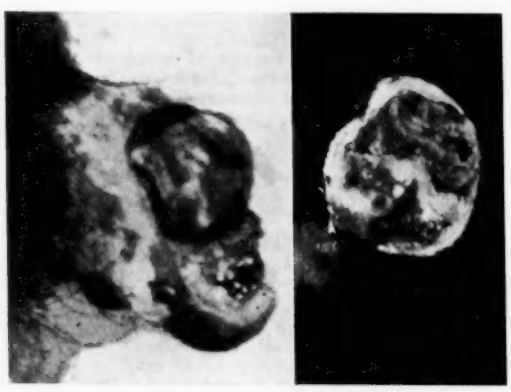
GRANULOMA venereum, a venereal disease of the tropics, is rarely seen even in the large seaports in this country. The incubation period is 7–14 days. The typical lesion develops on the genitals or the pubic or inguinal regions and consists of a circular ulcer, sharply punched out, with a rolled edge slightly undermined and a deeper excavation in one sector near the periphery of the ulcer, giving the appearance of a sump pit. The base of the ulcer is smooth and reddish-brown. There is a copious thin serous discharge with a penetrating odour but no slough. The causal organism is generally regarded as a bipolar staining inclusion-body first described by Donovan in 1905, and it is found in scrapings from the actively ulcerating portions of the lesions. The ulceration is deep, spreads rapidly, and may open into the urethra, causing a troublesome fistula.

Diagnosis is made from the clinical history and appearances, by demonstration of Donovan bodies, by biopsy and demonstration of the characteristic pathology of the active edge of the ulceration,[1] and by the exclusion of syphilis, carcinoma, chancroid, and the so-called ano-rectal syphiloma, or esthiomène, of lymphopathia venerea.

Treatment by intravenous or intramuscular injections of antimony checks the ulceration, and cicatrisation ensues. Thyroid gland orally and X rays or 1 per cent. tartrated antimony ointment locally are sometimes used to hasten healing.

[1] Manson-Bahr, P., and Anderson, S. M. (1927) *Brit. J. vener. Dis.* **3**, 12.



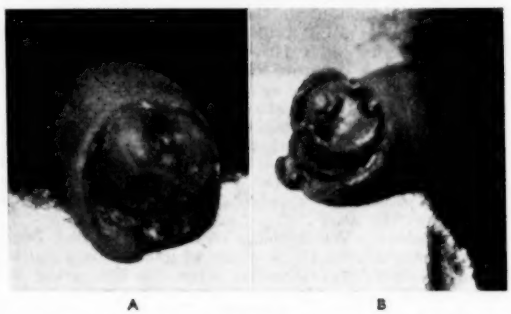
A B

FIG. 1—Granuloma venereum of penis as seen on patient's admission to hospital: A, lateral aspect; B, anterior aspect.

CASE RECORD

The patient was an English fireman, aged 24, with no history of previous venereal disease. He had had intercourse in Pará, Brazil, with a native woman about Sept. 20, 1938. Ulceration of the penis was noted on Oct. 4, 1938. The ship's surgeon reported that in spite of the application of mercurials and strong permanganate lotion the ulceration proceeded rapidly. The patient reported at the Seamen's Dispensary, Liverpool, on Oct. 19 with extensive ulceration of the glans and prepuce. A provisional diagnosis of granuloma venereum was corroborated by the discovery of Donovan bodies in scrapings from the ulcer.

The glans showed hypertrophic raised areas of mucous membrane and moderately deep clean ulceration, with a smooth red-brown base, extending laterally upwards and backwards from the meatus. The prepuce at first sight appeared to have had a dorsal slit recently performed, since there was a large V-shaped raw wound involving the entire free edge (fig. 1). The apex of the V and the broadest part of the ulcer were in the ventral middle line. The entire distal extremity of the penis was tender, swollen, and distorted. There was no inguinal lymphadenitis. The patient was pale and hollow-eyed and looked ill and as if he had had no sleep.



A B

FIG. 2—Same case as fig. 1, after a fortnight's treatment with M. & B. 693: A, anterior aspect: B, lateral aspect.

After the ulcers had been cleaned with saline and absolute alcohol had been applied, the serum obtained on three successive days showed no *Spirochæta pallida*. The Frei and Reenstierna tests were negative, thus excluding lymphopathia and chancroid respectively. The Meinicke test was negative on five occasions, but the Wassermann was "doubtful" in 1/5 serum and weakly positive in 1/1 serum on four occasions and did not become completely negative till the ulceration had healed. Donovan bodies were found in scrapings.

Dressings of normal saline were ordered during the period of search for spirochætes, and thereafter ointment of zinc oxide was used locally. M. & B. 693 six half-gramme tablets daily was the only general treatment, and administration was continued till complete epithelialisation had taken place—i.e., 14 days after commencement of general treatment.

M. & B. 693 was begun on Oct. 21, and immediate improvement was noted not only of the local condition but also of the general condition. By the 26th the ulceration of the glans was three-parts healed and quite half of the prepuce. On the 31st the lesions of the glans had epithelialised, and the raw area of the prepuce was reduced to a small oval area, about 1·5 cm. in length, at the most dependent part, and on Nov. 3 healing was complete (fig. 2). There has been no recurrence to date (Nov. 14th) and the penis is neither œdematous nor tender.

My thanks are due to Dr. W. M. Frazer, medical officer of health for the city and port of Liverpool, for permission to publish this case.

REVIEWS AND NOTICES OF BOOKS

Meningiomas

Their Classification, Regional Behaviour, Life History and Surgical End Results. By HARVEY CUSHING, M.D., surgeon-in-chief, Peter Bent Brigham Hospital, Boston; Sterling professor of neurology, Yale University. With the collaboration of LOUISE EISENHARDT, M.D., assistant professor of pathology, Yale University. London: Baillière, Tindall and Cox. 1939. Pp. 785. £3 7*s.* 6*d.*

A MONOGRAPH from Dr. Cushing's pen is an event in the neurological world, and the present long-awaited work, which surpasses its predecessors in bulk and excellence, is no exception. The meningiomas comprise some 14 per cent. of the primary intracranial tumours and for the most part lend themselves to surgical intervention, though extirpation may need heroic measures. The hazardous character of the enterprise and the colossal size to which these tumours may grow (400 grammes and over) combine to stimulate in neurological surgeons an attitude reminiscent of the enthusiastic angler. Some such sentiment doubtless lies behind the loving care which clearly has been lavished in compiling these records.

From the preface we learn that the work was first projected in 1917 but was then abandoned in order to deal with the acoustic nerve tumours. At that time 60 tumours in the meningioma group had been collected. By 1932, when the work was resumed, the number had grown to 313. This, while magnifying the labour needed to survey the whole field, has also brought a clearer perspective and a more certain knowledge of the end-results of operative treatment.

The tumours are divided into groups according to their sites of origin and are described in order following the direction of flow of the cerebrospinal fluid. In each group one case at least is fully described and sets of tables provide the essential features of the rest. The reader is inevitably carried along by the easy, often colloquial, prose so full of the humanity and engaging candour of the senior author. Precision of statement has sometimes been sacrificed to narrative style or even to wit, but the aphorisms and stray philosophical comments on subjects such as euthanasia provide ample compensation.

In contrast to some monographs of this type pathology receives adequate treatment, and in this Dr. Cushing has been fortunate in having the close and careful collaboration, over a period of many years, of Dr. Eisenhardt, now curator of the brain tumor registry at Yale. The predilection of the angioblastic meningiomas in this series for the neighbourhood of the torcula calls for the corroboration or otherwise of other workers; as does the greater tendency of this type to recur after surgical removal.

The senior author is not averse to a stray dig at the pathologists (vide p. 716), but admittedly, as he says, "one does not get the whole story from the autopsy": if one did, a far less lively and attractive account of this subject would have resulted. Historical matters are fully treated and the authors' own observations are freely interspersed with references to the experiences of others, to which the bibliography of 531 papers is good testimony.

The copious and excellent illustrations add to the value of the work.

Minor Medical Operations

By KENNETH HARRIS, M.A., M.D. Camb., F.R.C.P., physician, University College Hospital; and EDITH HARRIS, M.B. Lond., D.P.H., formerly deputy M.O.H., Borough of Hornsey. London: H. K. Lewis and Co. 1938. Pp. 198. 7*s.* 6*d.*

A SURGEON can no longer be defined as a physician who can use his hands. The modern physician has to perform various minor operations, some requiring considerable manual skill, often upon a fully conscious and apprehensive patient who will readily detect and complain of flaws in technique. In this book the operations which fall within the scope of the physician or general practitioner are accurately described. It covers a wide range of subjects; from the application of leeches to blood transfusion, from the administration of a simple enema to cisternal puncture, and from hypodermic injection to the injection of lipiodol for bronchography. There are a few errors and omissions: for instance, in the note on vaccination there is no mention of how the lymph is to be expelled from the capillary tube, and it is wrongly stated that three or four scarifications are still customary. The last two chapters are concerned with the general care of patients and with such measures as oxygen administration and the application of turpentine stupes. An accurate index is appended.

The authors modestly hope that their book may be useful to senior students and the recently qualified. It should be of use also to more experienced practitioners and nurses.

Form and Causality in Early Development

By A. M. DALCQ, professor of human anatomy and embryology, University of Brussels. Cambridge Biological Studies No. 1. London: Cambridge University Press. 1938. Pp. 197. 12*s.* 6*d.*

EXPERIMENTAL embryology is of fundamental importance. The causes which underlie the pattern and organisation of living things are best studied when they are making their first appearance. As the result of Spemann's discovery of the "organiser" phenomenon much light has been shed upon the physical and chemical conditions necessary for the appearance of structural patterns, upon the interactions between the parts of an embryo, and the dependence of these upon the organism as a whole. We can now say that certain general and localised conditions are necessary at certain stages for the appearance of normal structural form, and knowledge of the nature of these conditions is rapidly advancing. But we are as yet far from explaining the course of development completely in these terms and are compelled to assume the existence of potentialities for organised development which are released by the conditions which we are able to investigate. The discovery of the nature and manner of realisation of these potentialities would be an event as revolutionary as any in the history of science, but it will require the coöperation of embryologists, geneticists, and experts in molecular structure. In the meantime experimental embryologists find it necessary to study progressively earlier stages for the first signs of organisation, and in many cases events significant in this respect have been shown to precede fertilisation.

Prof. Dalcq reviews most of the recent work on these important early embryonic events. Much of this appears here for the first time in English.

He also develops some rather speculative theories which should stimulate further investigation. In view of the importance of the subject matter and the author's obvious enthusiasm it is nothing less than a tragedy that, owing to its style, the book is almost unreadable. Even an expert in this particular field will have difficulty in grappling with the author's abnormal idiom and use of words.

Theories of Sensation

By A. F. RAWDON-SMITH, M.A., Ph.D. Camb. London: Cambridge University Press. 1938. Pp. 137. 10*s*. 6*d*.

THE "special senses" have for some years become a domain for ultra-specialists, who may fundamentally be physiologists, psychologists, or physicists. Research in this field has been progressing so fast that even the experts have been loth to write books about the subject which are likely to be out of date before they are published, and many of the newer standard text-books of physiology omit any information about the special senses. But if it is difficult for these authors to understand and evaluate the present knowledge of eye and ear, it must be a great deal more so for the student, the young research worker, and the clinician seeking scientific background.

Dr. Rawdon-Smith has summarised recent researches on vision and hearing, describing the work in relation to current theories. The hearing section is complementary to the recent book by S. S. Stevens and H. Davis, in which the authors described the discovered facts and tended to leave the theory to unfold itself. This small book undoubtedly fills a gap in the literature and does it well, but it will not be read easily by anyone who is not already versed in the subject matter.

Schafer's Experimental Physiology

(6th ed.) By WILLIAM A. BAIN, Ph.D., reader in pharmacology in the University of Leeds. London: Longmans, Green and Co. 1938. Pp. 184. 7*s*. 6*d*.

TEXT-BOOKS of practical physiology are usually written around the course of exercises in vogue in a particular laboratory, and as each laboratory tends to have its own distinctive set the circulation of any one book is likely to be small. The author of this book is therefore to be congratulated on having created a demand for a new edition after a lapse of only four years. This fact tends to offset our criticism of the fifth edition, that the experimental instructions in the earlier part of the book dealing with the traditional nerve and muscle physiology are much more detailed than those appended to the later mammalian experiments which are actually more difficult and more complicated. It must be admitted that the latter are described in sufficient detail for use in demonstrations, and that the author advises the teacher to use his discretion in choosing which experiments he does himself and which he can safely leave to the class.

The book gives a sound and unusually detailed account of those experiments which can be performed on frogs and which still remain a necessary part of any course in practical physiology. They include not only the old classical experiments but several new ones, and the mammalian experiments are well selected. It seems a pity that in excluding chemical exercises gas analysis is omitted, while blood, even the enumeration of the corpuscles, is ignored. These omissions do not detract in any way from the general excellence of the book.

Symptoms and Signs in Clinical Medicine

(2nd ed.) By E. NOBLE CHAMBERLAIN, M.D., M.Sc., F.R.C.P., lecturer in medicine, University of Liverpool. Bristol: John Wright and Sons; London: Simpkin Marshall. 1938. Pp. 435. 25*s*.

A SECOND edition within two years of a book essentially for students indicates popularity. So often this means an absence of reasoning, unnecessary dogmatism, and a simplified shoddiness which attracts the time-saver. This is not the case here. The text is principled and accurate, and though some might alter a few stresses none could quarrel with the general proportion. Over-classification is avoided, with the exception of one large table of symptoms. The illustrations are clear, well chosen, and plentiful; perhaps the special chapter on the examination of children is not so well served. There are few alterations from the previous edition, though laboratory and scientific tests are now grouped together in two chapters. It is pleasant to read and free from the waggishness of some medical best sellers. This is an excellent, if not an indispensable, book for the student. It is not a short cut to medicine, but should encourage more time to be spent at the bedside and less at the fireside.

Yaws

By H. D. CHAMBERS, M.D. Aberd., medical officer, Jamaica, British West Indies. London: J. and A. Churchill. 1938. Pp. 169. 5*s*.

IN this little book the author, who has seen 8000 cases of yaws in Jamaica, endeavours to interest teachers, sanitary inspectors, and nurses, all in fact who can assist in the campaign against the malady. The work is divided into three parts: the first dealing with the history, geographical distribution, ætiology, epidemiology, and pathogenesis; the second with symptoms, course, and diagnosis; and the third with treatment. There is also an extensive bibliography. Much of the material is more than the lay reader can be reasonably expected to assimilate, while the medical reader will find important omissions. For example, the table in the chapter on diagnosis contrasting the disease with syphilis pays scant attention to the criticisms that have been levelled at these very points of differentiation. The author has, however, collected a mass of information about the disease in a form convenient to all who are brought in contact with it.

Poulsson's Text-book of Pharmacology and Therapeutics

(2nd Eng. ed.) By STANLEY ALSTEAD, M.D. Lpool, M.R.C.P., Pollok lecturer in materia medica and therapeutics in the University of Glasgow; physician to out-patients at the Western Infirmary. London: William Heinemann (Medical Books). 1938. Pp. 557. 25*s*.

IN this new edition of the English version of a famous Norwegian text-book Dr. Alstead has had to choose between revision so complete that the book loses its character and revision so slight that many old-fashioned ideas remain. He has attempted the middle course, but the changes he has made have not been drastic enough. To anyone acquainted with the main trend of pharmacology during the last few years it is amazing to find no mention of acetylcholine in the index and only a few lines in the text. The vitamins receive less attention than the volatile oils, and a discussion on the sex hormones occupies scarcely any space (incidentally Prolan B is not the same substance as Progestin). The disadvantage

of ferric salts in the treatment of anæmia (p. 488) is not their astringency but their inefficiency, and chlorosis (p. 484) is of very little importance to-day.

Some of the terms—e.g., multiple cerebrospinal sclerosis (p. 117)—are not sufficiently anglicised, and others—e.g., acetone-chloroform (p. 104)—are inadequately modernised. On the other hand, certain sections such as those dealing with quinidine and digitalis are excellent. For its size the book contains references to an unusually large number of drugs. It is one of the few text-books in English with the continental atmosphere.

Chemistry of the Amino-acids and Proteins

By CARL L. A. SCHMIDT, M.S., Ph.D., professor of biochemistry, University of California. London: Baillière, Tindall and Cox. 1938. Pp. 1031. 34*s*.

THE members of Prof. Schmidt's team are all well known in the field of protein chemistry and their book is the first in the English language to attempt a really full review of the physical, chemical, and biological properties of amino-acids and proteins. It is exhaustive in every direction. Thus under chemistry the method of synthesis of each substance is given together with full references to the chemical papers. On the analytical side various methods for the preparation of amino-acids and proteins are set out in considerable detail and useful sections are included on the use of special reagents, such as iodogorgoic acid and the Reinecke salt.

The proteins are treated with great thoroughness, the methods of analysis are well described, and in the same section there is a valuable chapter on the use of the ultracentrifuge and its application to the determination of molecular weight and molecular size. The physico-chemical side is dealt with in detail, and there are up-to-date accounts of the membrane equilibria phenomena, membrane potentials, and similar subjects. The biological aspect of proteins is also thoroughly treated, and here the reader will find an instructive discussion of the relation of proteins to immunity from the purely nutritional standpoint. The book will be of real value as a reference work for biochemical laboratories.

Practical Microscopy of the Teeth and Associated Parts

By A. W. WELLINGS, M.D.S. Birm., L.D.S. Edin., lecturer in histology and pathology of the teeth, University of Birmingham. London: John Bale, Sons and Curnow. 1938. Pp. 281. 12*s*. 6*d*.

WHEN Mr. Wellings says in his preface that this book has no pretensions to be other than a compilation drawn from all available sources, he is being modest. Not only has the vast literature been effectively ransacked but the author's own exceptional experience as a microscopist is everywhere in evidence and provides those practical tips which the worker in histology will find so useful.

The book is divided into two sections. The first deals with fixation and hardening, decalcification, section-cutting, stains, clearing, and mounting. The technique and underlying principles of each of these are described fully, and are annotated in the light of the author's experience. The second part discusses in detail the application of microscopic methods to the various dental tissues, including such latest developments as tissue culture, micro-incineration, micro-dissection, and vital staining. The book contains an introduction of 30 pages which is a critical review of recent discoveries in dental histology; and it is so excellent a summary of our present knowledge that it leads us to hope that Mr. Wellings will follow up his book by another on dental anatomy. This is undoubtedly the most complete manual dealing with the technique of dental histology that has appeared. It should quickly take its place among those books which every worker in the subject finds indispensable.

Oxygen and Carbon Dioxide Therapy

(2nd ed.) By ARGYLL CAMPBELL, M.D., D.Sc. Edin., member of the research staff of the National Institute for Medical Research; and E. P. POULTON, M.A., D.M. Oxfd, F.R.C.P., physician to Guy's Hospital. London: Humphrey Milford, Oxford University Press. 1938. Pp. 202. 12*s*. 6*d*.

IN spite of the increasing popularity of oxygen therapy the methods used for its administration are often extremely inefficient. This is true of some of our teaching hospitals as well as of general practice, and it is to be hoped that the publication of a second edition of this excellent book is evidence of increased interest in the rational use of oxygen in the treatment of disease. The text of this edition is essentially similar to the first. The various methods of oxygen administration are described and the indications for its use are reviewed and illustrated by case reports. A valuable addendum has been included which describes more recent models of the bed and face tents, and compares the efficiency of the nasal catheter, forked nasal tube, and oxygen tent.

Textbook of Physiology

(6th ed.) By WILLIAM D. ZOETHOUT, Ph.D., professor of physiology in the Chicago College of Dental Surgery (Loyola University). London: Henry Kimpton. 1938. Pp. 714. 18*s*.

THIS book, the author states, is intended to fill the gap between the larger texts of which there are many in the field and those offering a briefer course. The whole of physiology is covered in an elementary but sound fashion, and in the last two editions the greater part of the text has been brought up to date. The most attractive feature of the book is its completeness, in the sense that the student of average education will find in it everything he needs for an introduction to physiology. General physiology, histology, biochemistry, and a certain amount of anatomy all find a place, and the properties of three tissues—muscle, nerve, and blood—are studied before the reader is asked to grasp the more difficult idea of coördination as manifested in the circulatory, respiratory, and nervous systems. The book is not sufficiently advanced for medical students, but is excellent for science students beginning their study of physiology. The glossary of technical terms, prefixes, and suffixes will be found useful by those strange to anatomical and medical terminology. The book in fact fills, and fills well, the gap of which the author was mindful.

NEW INVENTIONS

A NEW INTRAVENOUS CANNULA

THE cannula here described (fig. 1) is a modification of that described by Marriott and Kekwick (fig. 2*a*). Their cannula was a great advance on previous designs, in that it embodied a right-angled bend which allowed the tip to lie snugly in the vein while the shaft lay flat along the skin surface. This disposed of the chief difficulty encountered in continuous drip transfusions, where it is desired to fasten the cannula

to the skin and keep the tip inside the vein in the correct alignment. In the older types whenever the shaft was depressed to approximate it to the skin surface the tip tended to project upwards or sideways so that the terminal opening was occluded by the wall of the vein, thus slowing down or stopping the flow and predisposing to thrombosis.

In Marriott and Kekwick's design, also, the tip was expanded so as to prevent the cannula from slipping out of the vein once it had been tied in.

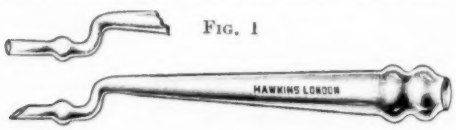


FIG. 1

This was an excellent idea, but the expanded tip was so large that it was very difficult to introduce into any but the largest veins.

A further modification was added by R. Officer, late resident surgical officer at St. Mark's Hospital, who had the expanded end made somewhat smaller and more rounded (fig. 2*b*). This type was easier to introduce but was still too large to insert easily into many of the smaller veins that we are in the habit of using in order to conserve the larger veins for emergencies.

In order to facilitate entry into the smaller veins, I had a cannula made for me with a narrow extension

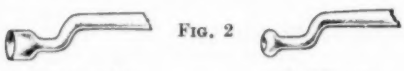
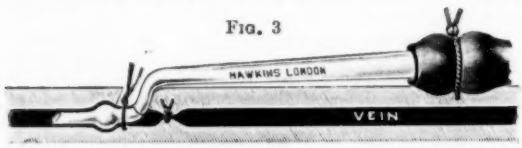


FIG. 2

(*a*) Kekwick's (*b*) Officer's

beyond the bulb. The extremity can be introduced into very small veins quite easily, and the bulb will then slip in without difficulty and the ligature can be tied behind it. This cannula retains all the good points of Marriott and Kekwick's design, the only alteration being in the tip. There are two forms as illustrated (fig. 1). One has the end cut off square. This was the first design and it works perfectly well. In the second form the tip has been bevelled off more to a point with the idea of making it still easier to introduce, and it certainly goes very easily into quite tiny veins. This is the pattern now used as a routine at St. Mark's Hospital. The second pattern is open

FIG. 3



to the theoretical objection that the oblique terminal opening might be more easily occluded by the wall of the vein. Actually this does not seem to happen in practice, probably because the cannula can be fixed so that it lies in the correct alignment in the vein with the tip free.

The method of use is roughly the same as that of Marriott and Kekwick. The ligature round vein and cannula is tied tightly, and the bulb prevents the cannula from coming out. The ends of the ligature are left long to facilitate removal. The cannula is further secured in position by stitching its shaft to the skin. The stitch is usually of silk thread, and is passed round the rubber tubing on the proximal end of the shaft and through the skin (fig. 3). It does not seem to give rise to any discomfort. A similar stitch is usually used to secure the rubber tubing near the wrist, and this is an additional safeguard against dislocation of the cannula by any sudden pull or movement of the arm. If the vein used is below the bend of the elbow it is quite safe to allow the patient free movement of the arm if the cannula has been secured in this way. Thick-walled tubing should be used so that it will not be occluded by the weight of the arm if it becomes displaced.

The actual dimensions of the cannula are as follows. The diameter at the tip is 2 mm. and at the widest part of the shaft 4 mm. The length of those supplied is just under 7 cm. Other sizes could be made to order but a larger size is really unnecessary and a smaller size would only be required for babies and very small children. The cannula was made for me by A. L. Hawkins and Co., Ltd., of 15, New Cavendish Street, London, W.1.

C. J. C. SIGGERS, M.R.C.S.,
Resident surgical officer at St. Mark's Hospital for Diseases of the Rectum, London.

REPORTS AND ANALYSES

V.P. GREEN POINT GINGER WINE: V.P. WHITE POINT WHITE SWEET WINE: V.P. AMBER POINT BRITISH SHERRY: V.P. RED POINT RICH RUBY WINE

(MESSRS. VINE PRODUCTS LIMITED, "V.P." WINERY, KINGSTON-ON-THAMES, SURREY)

WHEN analysed these wines gave the following results:—

—	V.P. Green Point	V.P. White Point	V.P. Amber Point	V.P. Red Point
Alcohol (volume per cent.)	15·5	17·2	18·0	17·4
Equivalent to proof spirit (per cent.) ..	27·0	30·0	31·4	30·4
Invert sugar (per cent.) .	15·5	9·03	3·34	9·52
Cane sugar (per cent.) ..	5·5	0·50	0·80	0·50
Fixed acidity (as tartaric acid per cent.) ..	0·54	0·36	0·39	0·39
Volatile acidity (as acetic acid per cent.) ..	0·01	0·02	0·01	0·01
Mineral matter (per cent.)	0·22	0·25	0·24	0·31

V.P. Green Point Ginger Wine.—This wine has a very agreeable palate and, unlike some ginger wines, is not overloaded with ginger. It may be described as fairly sweet and the alcohol content is higher than in most brands.

V.P. White Point White Sweet Wine.—The wine is sweet and light brown in colour. The alcohol, sugar content, acidity, and palate are suggestive of white port.

V.P. Amber Point British Sherry.—The resemblance in composition and palate of this wine to sherry is very striking.

V.P. Red Point Rich Ruby Wine.—This is a very pleasant wine to the palate, and is distinctly vinous in character, more so than the White Point, which is a sweet wine. It resembles port very closely in its composition.

These four wines are sound, wholesome, and matured products; the last three differ only from the respective imported wines in that they are made in this country.

THE LANCET

LONDON: SATURDAY, JANUARY 7, 1939

AFTERCARE

WHAT can be done to prevent the tuberculous patient from relapsing? If an answer could be found to that question tuberculosis would cease to be a social problem. But the replies of a number of experts,[1] recently published, do not hold out much hope of an early solution. Pulmonary tuberculosis has many manifestations, some of them so benign that they do not seriously threaten either life or earning capacity. Tuberculous pleurisy with effusion may be taken as an example, especially when it occurs in the first half of life. From this condition permanent recovery is the rule and a few months' detention in a convalescent institution is all that is required to establish a definitive cure. But consumption is a life sentence. Once caseation has led to a breaking down of pulmonary tissue, however limited in its extent, once tubercle bacilli have been found in the sputum or evidence of cavitation in the radiogram, the best that can be hoped for is an arrest of the disease which at any moment may break out again. It is true that a small proportion of sanatorium patients are cured in the sense that the disease, arrested by a fairly good natural resistance with the aid which modern treatment can give, is so firmly checked that it is unlikely to break out again. But even a relative immunity may be overborne by the stresses and strains of any form of active life, whether in office, factory, or house. And the average consumptive leaves the sanatorium in a state which is little better than an equilibrium between attack and defence. The patient who just holds his own while putting no strain on his resources relapses directly he is compelled to draw upon them. The credit in the account of the consumptive is always a very small sum. If relapse is to be avoided the consumptive, who as the result of treatment is fit to work, must be provided with work which puts no tax on his very limited capacity for exertion, he must remain under continuous medical supervision, he must be able to obtain sick leave whenever any flagging of his energies indicates that a relapse is threatening, and mental anxiety concerning his own future or that of his dependants must be reduced to a minimum.

It is easy to ridicule a system which, as Dr. K. N. IRVINE points out, provided more complete and effective medical aid for the diagnosis and treatment of this disease than that provided for any other social scourge, and which yet apparently does so little to ensure the permanency of its results. It is not so easy to find means to secure the future of all those who have passed through the sanatorium stage but who can only maintain a precarious balance between health and sickness if living a life so completely sheltered that social, mental, and physical stresses are alike excluded. Faced with a problem of this magnitude it was perhaps inevitable that the social worker should adopt a slogan. We are asked to believe that the salvation of the consumptive can be secured by "Care and Aftercare." A slogan is usually half of the truth and is own brother to the Victorian white lie. If by aftercare we imply no more than the ministrations of a local committee of kind-hearted persons doling out dairy produce in limited quantities on the instalment system, the suggestion that it can be any real answer to our problem is fantastic. Papworth and Preston Hall represent the minimum of effective aftercare and these, admirable as they are, have touched but the fringe of a national problem which could perhaps be only adequately dealt with by the erection of a system of concentration Papworths throughout the country and the adoption of compulsion to secure their proper working. The consumptive seldom leaves the sanatorium in a fit condition to take his chance in the open market. But enfeebled health is not the only difficulty he has to face. The nature of his complaint militates against his chances. The employer struggling to develop his business against strenuous competition cannot afford to employ crocks, and in justice to his employees should not permit the risk of infection in his office or factory. Tuberculosis workers have often protested against the unfairness of regarding the tuberculous as lepers. Yet tuberculosis is perhaps more infectious than leprosy, a disease with which it has some affinity. No one would condemn an employer who refused to provide work for a leper in his office. The danger that an office boy or typist may contract tuberculosis from close association with a consumptive clerk is not negligible. A desire to help the unfortunate victims of a social scourge should not blind us to the risks that others may run from contact with a patient who may have been a safe companion at the time he received a certificate of fitness for work, but who after an attack of influenza may be spraying the atmosphere of an overcrowded and ill-ventilated room with tubercle bacilli.

If aftercare is to be made effective it will have to be planned upon a far larger scale than any hitherto adopted, and the care of the community as well as the patient will have to be taken into account. Both objects can, however, be attained by adequate attention to the latter. If able to work the consumptive should be provided with employment suited to his capacity and in a situation where he cannot be a danger to others. If unable to work he should be supported either in an institution where enforced segregation implies no hardships or in his own home where he can be treated by his panel practitioner and where his welfare, and that of his family, can be supervised by the staff of the tuberculosis dispensary. Workers in this department might well ask themselves whether too much attention has not been directed in recent years to the erection of buildings for the medical and surgical treatment of tuberculosis

[1] A symposium in the *British Journal of Tuberculosis*, October, 1938, p. 208.

and too little to the consideration of tuberculosis as an infectious disease. Even the most enthusiastic advocate of the scalpel and the hollow needle must admit that the results of his treatment are more than disappointing. The social worker may well ask why the gravest of all the infectious diseases known among civilised communities is allowed to pursue its devastating course although it could be abolished, as so many other scourges have been abolished, by the rigorous control of infection. KING EDWARD VII did not say that consumption was curable nor ask why it was not cured. He observed that it was preventable and asked why it was not prevented. If prevention were adequate there would be no need to consider the problem of aftercare.

HEALTH AT SCHOOL

"The Health of the School Child," presented by Sir ARTHUR MACNALTY,[1] is an annual review by the medical officers of the Board of Education, who are in a position to collate the reports and opinions of their colleagues in the school service throughout the country. Of late years this review has tended to be less documentary than philosophical and its deductions on the development of school medicine are not made exclusively from the material supplied by the year that is being described. Owing to the absence of standards, and even of definitions, of most of the functions of child life, and the differences in experience and in ideas of the many practitioners engaged in school work, statistics of school medical inspections are in themselves of little value; but to those familiar with the factors that give the individual returns their bias they yield much accurate information on the changing aspects of child health. Some years before the retirement of Sir GEORGE NEWMAN, the medical officers of the Board of Education realised that the reprinting in detail of the figures and rates of the "defects" found in school-children was more apt to mislead than to enlighten, and that the figures of one locality compared with those of another showed up the variations of the observers more clearly than those of the defects detected. Accordingly the figures are now given more generally, and comparisons of rates in different areas are quoted mainly to draw attention to conflicting methods of recording, or diverse views of treatment and prevention.

The most surprising finding of thirty years' school medicine is the continuous improvement in weight, height, and physique in all children, of all ages, everywhere, even in the most depressed areas. The improvement is masked to some extent by the physical and mental fatigue about which school teachers are unanimous although exact data are not available. The Spens committee would like [2] the Board of Education to ask school medical officers to inquire and report. The physical gains however have been really substantial: leavers aged 14 to-day are about a stone heavier and three inches taller than those who left school at the same age twenty years ago. There are many reasons for this improvement, but as the heights and weights found to-day in children attending the elementary schools are still below those ruling in the public schools, it is probable that we are seeing a rebound to "normal" from the stunting produced by the deplorable conditions of child labour in the last century. Despite this general improvement, which is obvious in many directions apart from height and weight, the incidence of defects and diseases recorded in routine medical inspection is remarkably constant. Local departures from the general, often considerable, appear less from true variation of incidence than from differences of search, or recording. Thus the recorded percentage of children with ear disease will be much influenced by whether the auroscope is used as a routine; that of pulmonary tuberculosis by the evidence accepted as proof of that condition. (Some years ago more cases of pulmonary tuberculosis in children were recorded from a small corner of rural England than from the whole of Sweden!) The most constant of all defects is organic disease of the heart, which affects 1·6 per 1000 children seen at routine inspection. The commonest "defect" is defective sight (about 80 per 1000), most of which is due to departure of the refractive index from emmetropia. But as emmetropia is not the normal index in children, departures from it cannot rightly be called defects. Most of the so-called refractive errors in children are attributable to physiological variation, genetically determined, and the study of them was mainly instrumental in directing preventive medicine to the management of variants. What the findings mean is not that large numbers of our children have diseased eyes, but that the normal eye of a child is not designed to read small print: the supply of spectacles to school-children is no more treatment for defects than is the use of the telescope to see objects outside the range of unaided vision. Another part of the body in which standards vary is the tonsil, and the need or otherwise for tonsillectomy is a subject more contentious than any other in school medicine. The chapter devoted to it in this year's report is, one may guess, written by Dr. J. ALISON GLOVER, senior medical officer of the Board, who has often spoken emphatically on the abuse of the operation. He has not yet found it possible however to secure general agreement, and more research will probably be necessary before the indications for operation can be defined to everyone's satisfaction.

School medicine started with the avowed object of detecting and treating ailments of school-children which had been neglected. The care given was that of ordinary family practice and the service was soon accused of encroaching on the work of private practitioners. This accusation was not altogether just, for though the work was that which private doctors could do, and should have done, they had not done it. For a time the treatment carried out in the school clinics was little different from what might be done in a private

[1] The Health of the School Child. Annual Report of the Chief Medical Officer of the Board of Education for the year 1937. H.M. Stationery Office. Pp. 171. 2s. 6d.
[2] Report of the Consultative Committee on Secondary Education. H.M. Stationery Office. Pp. 477. 3s. 6d.

surgery or out-patient department, but as school medicine develops, the tendency will be to give to private practitioners as much of this general minor medicine as they can manage and for school medical officers to pursue the health of the school-child in directions other than by the remedy of his minor physical diseases. In the conclusion to the body of the report, Sir ARTHUR MACNALTY defines the main object of school medicine as training in the laws of health adapted to the needs of the individual. This is child guidance in the broadest sense and covers many social and biological factors besides the treatment and prevention of disease.

A MAMMALIAN TUMOUR FILTRATE

IN the early days of cancer research transplantation of tumours was the most popular means of investigation, largely because it was the one experimental method then known. Today the cause of cancer and of tumour induction is being vigorously analysed. Probably the most puzzling problem facing the experimenter is the relationship between the filtrable agents of tumours and the chemical or physical means by which new growths are obtained. The number of the latter now known is considerable; but of the former—the filtrable agents—there are relatively few. The discovery of a filtrable agent in a mammalian tumour, or even its confirmation, is therefore an event of outstanding importance, and it deserves to be dragged into the limelight.

Embedded deeply in a wealth of histological detail under the title "changes in the lymph glands of tumour bearing mice," there is reported in the current number of the *Journal of Pathology and Bacteriology* a repetition of the filtration of a chemically induced mammalian tumour. In 1936 L. D. PARSONS [1] announced that she had obtained tumours in mice by means of a filtrate made from a sarcoma originally produced by the water-soluble compound 1 : 2 : 5 : 6-dibenzanthracene-9 : 10-αβ-succinate. One of the original tumours was propagated by cell grafts, some of which yielded active filtrates. Just as the tumour strain was about to be discarded because of bacterial infection, yet another attempt was made to filter it. On this occasion success was attained by subcutaneous injection of filtered extract, plus whole blood, into irradiated mice. From the tumour revived in this way other filtrates which were active alone without added blood were afterwards secured.[2] In both papers Dr. PARSONS gives details of the preparation of the filtrate. The original tumour had certain unusual properties, and others have been added during its passage from cell graft through filtrate and back again to graft. Formerly the tumour, a spindle-celled sarcoma, did not metastasise and did not give rise to glandular enlargement; it was associated with myeloid changes in the blood, spleen, and marrow; and whole-blood inoculations of tumour-bearing mice failed to produce sarcomas. Since the second passage by filtration, the blood changes have remained as before but glandular metastases and enlargements have become prominent. Moreover subcutaneous injections of all lymph-glands other than the submental (whether or not they showed macro- or micro-scopic changes) and also injections of whole blood alone (in 40 per cent. of attempts) produced sarcomas. If blood alone is active the fact that growths can be obtained from apparently normal lymph-glands, from distant parts outside the regional drainage area, is less strange than it would be otherwise, for these glands too contain whole blood. No mention is made of attempts with other organs. Successful inoculations with spleen pulp [3] and blood [4–6] and also with lymph-glands and lung [7] from rat and mouse tumour-bearers have been reported before, and it is probable that all have included metastasising cells. Interesting as these results are and also the associated morphological appearances in the lymph-glands, they are far surpassed by the record of yet another success with a mammalian filtrate.

In criticising the description given by Dr. PARSONS to her report we are happily able to make a constructive suggestion. The output of papers on experimental cancer research is so great, and the viewpoint of the experimenters so various, that it has become really important that the titles of articles should indicate their content, and the index of experimental cancer research which is being compiled by the International Cancer Research Foundation will accordingly provide a guide to appropriate titles. If authors will make use of it, both they and their readers will be saved much labour and bad language. A heading for example in which the phrase "tumour induction" appears will indicate that the main endeavour or result of the work was concerned with initiation of the tumour process; while "tumour transplantation" will show that the behaviour of the tumour after initiation has been investigated. "Resistance to transplantation," "treatment of spontaneous" or "induced tumours," and "treatment of transplanted tumours" are also phrases that show the relationship between a particular paper and the whole subject. Unless some conformity of this nature is attained, facts of great importance may be relegated to oblivion.

LIFE-EXPECTATION OF OARSMEN

GAMES used to be just pastimes; now they are agents of physical culture and must be examined as such. Rowing is generally and perhaps rightly regarded as the most strenuous form of violent exercise. Its comparative slowness is a serious physiological disadvantage; for whereas in other games the muscles of the limbs act as subsidiary pumps by squeezing on the veins, and so assist the circulation, in rowing the movements are too slow to give the heart much help.

[1] Parsons, L. D., *J. Path. Bact.* 1936, **43**, 1.
[2] *Ibid*, November, 1938, p. 501.
[3] Blumenthal, F., and Auler, H., *Z. Krebsforsch.* 1927, **24**, 285.
[4] Blumenthal, Auler, and Solecka, M., *Ibid*, 1927, **25**, 229.
[5] Blumenthal, *Ibid*, 1929, **29**, 549.
[6] Gross, L., *Ibid*, 1932, **37**, 562.
[7] Flaks, J., *Ibid*, p. 504.

Furthermore, the mechanical conditions demand that the breath is held in order to keep the chest distended and fixed to provide firm points of attachment for the muscles during their contractile efforts—rigid fulcra for their levers. In running anything over a hundred yards, inspiration and expiration follow each other in uninterrupted succession; in rowing, both respiratory acts are hurried through during the time in which the muscles are relaxed—i.e., towards the end of the stroke and on the forward swing of the body preparatory to another. The old-time heavy broad boat, with its clumsy and unwieldy oars and rowlocks, necessitated a slow protracted stroke which has been more and more replaced by one of high pressure. When both upper and lower limbs had much to do in dragging the oar through the water, there was plenty of muscular exertion for the whole frame with little distress to heart or lungs. As rowing has advanced as an art it has necessarily deteriorated as an exercise; the tendency has been towards making the muscular effort less and the respiratory effort or strain greater. If, then, any form of violent exercise could be held responsible for the more or less hypothetical "heart-strain," or for some latent disability which might lead to permanent incapacity or premature decease, rowing would be the one to select. The sudden death at the age of 50, a few months ago, of one of the most famous of oarsmen has resuscitated the suspicion, intermittent ever since strenuous athletics and other feats of exertion have been popular, that serious physical damage can result from an extreme feat of exertion or from a continued athletic career. In E. v. Bergmann's "Funktionelle Pathologie," and in other works such as Breitner's, the assertion is made that men participating in boat-racing seldom reach the age of 50, an assertion which is vigorously contested by Prof. KNOLL[1] of Hamburg.

It is incredible that such a statement can possibly have taken into consideration the statistics available in this country, as Prof. KNOLL who has drawn upon the official centenary history (Drinkwater and Sanders) of the University Boat Race convincingly demonstrates. The average age of participants in the race is 21 years 4 months. The average age of all old Blues up to 1929 (including those living at the present day) is 56 years 1 month. Excluding deaths due to the war, and to infections and tropical diseases, only 8·1 per cent. of the total died prematurely; at least a quarter passed 70. The pioneer investigation of this kind was that undertaken in 1873 by JOHN EDWARD MORGAN, the Manchester physician, published under the title "University Oars" (Macmillan). MORGAN's inquiry included a questionnaire addressed to all individuals who rowed between 1829 and 1869, thus obtaining in all 294 life-histories, 40 having died. The subjects were invited to express an opinion whether they had derived benefit from their aquatic career or were conscious of disadvantages or injuries, statements which from the nature of the answers would hardly be scientifically acceptable. But the comparatively low death-rate was at least unequivocal. G. MEYLAN in 1904 undertook a similar investigation upon Harvard oarsmen between the years 1852 and 1892 and came to the conclusion that the life-expectation was considerably longer than that of selected risks from insurance tables. More recently COOPER and colleagues[2] considered the oarsmen of Ormond College, Melbourne University, between 1885 and 1905 and found that of 100 men 17 had died from natural causes. The expected mortality of men of an average age of 21 during the years in question is 31·8 per cent. as quoted by the Australian Mutual Provident Society.

It may, of course, be objected that all such investigations deal with material that is very highly selected, which is not merely first-class but so to speak super-class. To this one would answer that the practice of rowing in itself has the action of a filter separating the inadequate or imperfect. It may further be contended that even a nonagenarian old Blue may in consequence of his exertions 70 years previously have reduced his chance of reaching his century. Such an argument is unanswerable: not even the most enthusiastic supporter of violent exercise who sets out to deny any malevolent effect would desire to claim that it confers immortality.

[1] Knoll, W., *Med. Klinik*, 1938, **34**, 464.

THE HONOURS LIST

THE selection of citizens for particular honour and particular honours is necessarily arbitrary, but none would dispute the claims of the men and women whose names appear on p. 54. The new medical baronet, Dr. J. D. Pollock, has long since strayed from medicine but is gratefully known to us all as a benefactor of Edinburgh students. The five new knighthoods recognise the work of Mr. John Ramsay in Australia, of Colonel A. J. H. Russell and Colonel K. V. Kukday in India, of Prof. W. W. Jameson in London and on his imperial missions, and of Dr. Adolphe Abrahams close at hand at the Westminster Hospital. Of the two nearest us here Dr. Abrahams is a pace-maker, in physique and wit and effort, and has worked untiringly for the new Westminster medical school: he is also one of those physicians who give the last patient as much care as the first. Prof. Jameson, as dean of the London School of Hygiene and Tropical Medicine, where he has now spent nearly eleven years, has won general admiration by his ability to see, to think, and to act. Outside the ranks of medicine we record with pleasure the knighthoods conferred on Mr. Frank Pearce, consulting dental surgeon to Guy's Hospital, and on Prof. Robert Robinson, F.R.S., of Oxford, who lately collaborated with Prof. Dodds in the discovery of stilbœstrol; and we are also glad to note Miss Ellen Musson's promotion to D.B.E. for her devoted service as chairman of the General Nursing Council. We offer congratulations to all our colleagues, both inside and outside the medical profession.

[2] Cooper, E. L., O'Sullivan, J., and Hughes, E., *Med. J. Aust.* 1937, **1**, 569.

ANNOTATIONS

MEDICINE AND A.R.P.

THIS week's writer of Grains and Scruples tells us that not long ago he was watching aerial manœuvres, complete with "black-outs," on the shore of the New World close to where the Pilgrim Fathers landed. But it is in no mood of panic or despair that we open the New Year with a study of the precautions which medicine should take in the event of aerial attack. The authors of this study, though best known as consulting surgeons, hold the rank of colonel in the Territorial Army. Mr. Mitchiner was resident surgeon to the 5th London General Hospital which received all the serious cases arriving at Waterloo in the convoys of wounded, often within 24 hours of injury; later as surgeon to the Serbian Army on the Salonika Front, and in the Serbo-Albanian war, he had first-hand experience of wounds of all descriptions. The stimulus to write these articles was given by inquiries received from medical men during the September crisis, asking what they were to do and how they were to do it. He was struck by the extreme lack of knowledge of any war organisation or surgical practice shown by those inquiries; and, on his finding that Mr. Cowell's experience was similar, they decided to pool their knowledge. Mr. Cowell was surgeon-specialist to No. 23 C.C.S., making front-line observations on shock, in association with Cannon, Bayliss, and others, for the Medical Research Committee. He was Red Cross delegate to the Brussels conference dealing with the protection of civil population in air-raids, and as county director has organised A.R.P. personnel in Surrey. Mr. Cowell has just returned from Barcelona where he saw the work of Drs. Trias and Huerta and inspected the blood-transfusion service of Dr. Doran-Jorda. The first instalment appearing this week deals with organisation. The next will set out the expectation of casualties and the effects of aerial bombs; the third will deal with the general principles of wound surgery and anæsthetics. Regional surgery will be covered in the remaining numbers of the series, concluding with an article on the nursing of casualties. The articles form part of a volume which is to be published by Messrs. J. and A. Churchill, probably in April next.

GOUT

THE advance of medical knowledge within living memory has been so rapid, particularly in the last fifteen years, that it has become next to impossible for the ordinary mortal to keep pace with it. Diseases which not long ago were common both in ward and out-patient department have now almost disappeared, and others in their conventional forms are likely to vanish before long. Yet in spite of these tremendous successes, our knowledge of some diseases remains much where it was. Some of the recent articles on gout illustrate this only too clearly. The ætiology of the disease is still obscure[1] and, as Dr. Price reminds us in our present issue, even its exciting causes are ill defined. It has been established that the mammal can synthesise uric acid from proteins, but the identity of the essential amino-acids has never been definitely settled.[2] Diagnosis is still made on the same evidence,[3] though the biochemists and the radiologists have done something to help, and treatment has altered very little. Thus the recent paper of Coste, Grigant, and Lamotte[4] on the beneficial effects of purine-free diets might almost have been written twenty years ago. While this is disappointing, particularly for the unfortunate sufferers from the disease, the situation is far from hopeless. Indeed, the lack of progress is largely due to lack of intensive study. In spite of the eminence of some of its victims the disease is out of fashion. It cannot be reproduced in animals and there is little at the moment to tempt the research worker to take up the subject. Leads are few, and, for the individual, prospects of success are meagre. The whole position might be changed, as it was in diabetes and pernicious anæmia, by one chance discovery. Until this happens, gout will continue to be one of the Cinderellas of medicine.

HEALTH AND SAFETY IN COAL-MINES

ACCIDENTS, fatal and non-fatal, are more numerous in coal-mining than in any other occupation, and the list of dangers to which miners are exposed reads like a litany—sudden death by explosion and fire and flood, by falls of earth and shaft cages; asphyxiation by gas, electric shock, and entombment; injuries and joint troubles of all grades of severity; and less dramatic but equally disabling affections such as silicosis and nystagmus. Each year one miner in nine hundred loses his life, and two in every eleven receive compensation for injury sustained or disease contracted during the year. Despite regulation and inspection by the Mines Department there has been no appreciable reduction in these figures for the past 15 years. The Royal Commission on Safety in Coal Mines, after an inquiry lasting three years, are insistent[5] that such figures cry out for reduction, and they feel sure that, given the necessary effort, substantial improvements can be made. Such effort up to a point can be directed and controlled by statutory regulation, but in the main it must come from the industry itself through improved discipline, supervision, and training. At present there is little or no organised provision in the industry as a whole, or in the separate coal-fields, for the education and training of its officials. The changes which have taken place in the conditions in mines and in mining practice since the passing of the Coal Mines Act in 1911 are broadly the result of concentration and the intensive use of machinery, together with the fact that thinner, deeper, and more difficult seams of coal are being worked. The output of coal is now obtained from fewer mines and from shorter faces in the individual mines. The more rapid advance of the coal face increases the rate at which firedamp is emitted, a fact which calls for more efficient ventilation. There has been an increased use of steel arches and girders for roof support, so much so that in 1935 over 2000 miles of underground roads were supported by steel arches. New factors of danger are however introduced by the presence of machinery, by the noise it makes at work, and by the increased production of coal dust in the operations of mechanical cutting and conveying. Over the same period of time there have been improvements in every kind of mining equipment, among which may be mentioned devices for preventing shaft

[1] Copeman, W. S. C., and Samuel, E., *Lancet*, 1937, **2**, 190.
[2] Crandall, W. A., and Young, E. G., *Biochem. J.* July, 1938, p. 1133.
[3] Hill, L. C., *Lancet*, 1938, **1**, 826.
[4] Coste, F., Grigant, A., and Lamotte, M., *Pr. méd.* July 20, 1938, p. 1129.
[5] Report of Royal Commission on Safety in Coal Mines. Cmd. 5890. H.M. Stationery Office. 1938. Pp. 520. 7*s.* 6*d.*

and haulage accidents; scientific instruments for detecting and measuring firedamp, dust concentration, and humidity; the improvement of various means of controlling both coal and stone dust; and the general adoption of protective clothing and of improved rescue appliances.

The commission's recommendations begin with more effective administration of the law as it stands. The head of the health and safety division and the chief inspector should be relieved of routine work and made freer to devote themselves to the larger problems. Substantial additions should be made to the technical staffs at headquarters including the appointment of more specialist inspectors, and in particular an inspector of mechanical engineering. The salaries of inspectors should be increased so as to attract the best type of man, and the number of separate inspection districts should be increased. In dealing with firedamp standards it is recommended that the withdrawal standards for workmen in safety-lamp mines should (after a reasonable period for any necessary improvement in the ventilation) be reduced from 2½ to 2 per cent. In naked-lamp mines men should not be permitted to remain at work with naked lights if any gas can be found with a flame safety lamp in the ventilating district in which they are to work or pass. As a general principle every seam should be worked by safety lamps unless it is proved that naked lamps are safe. Any newly opened seam should have three main airways and compressed air should only be used for ventilating purposes with the express consent of the district inspector. Great importance is attached to the value of good lighting in the prevention of haulage accidents, and attention is drawn to the connexion between good lighting and the diminution of nystagmus.[6] The problem of limiting the production of coal dust (which is a fruitful source of explosions) on mechanised working faces has not been solved and requires further investigation. An obligation should be laid on the management to deal with dust production at conveyor junctions and loading points and to keep the roads free from accumulations of dust. In regard to silicosis in coal-mines many points in its ætiology and geographical distribution remain to be cleared up before preventive measures can be accurately formulated. But the rapid increase in the incidence of the disease is too serious to permit of indefinite delay, and the commission suggest a statutory obligation to keep the dust concentration in the air below a prescribed maximum (e.g., 450 particles per c.cm. as measured by the Zeiss konimeter) (*a*) in all mines when the driving of stone drifts or the sinking of shafts is being carried on, (*b*) in mines where there is a proved liability to silicosis while any work is being done in stone. In operations and places where it is impracticable to suppress or collect dust the persons at risk should wear dust respirators of an approved type.

An obvious recommendation is that all young persons under 16 years of age, on entering the mining industry, should be medically examined in order to obtain certificates of fitness. Such a system has been in force in factories for many years and it is surprising to learn that coal-mines have hitherto been exempt. It is further recommended that in regard to employment on heavy work boys below ground should be put on the same footing as those who work on the surface. Recommendations designed to improve the standard of first aid in mines include provisions that attendants should, in addition to holding first-aid certificates, receive special hospital training, and in every mine a doctor (not necessarily full-time) should supervise first-aid arrangements. In order to guard against septicæmia every person who sustains injury, however slight, should report before leaving the mine premises.

The report itself is proof that the three years occupied by the inquiry have been well spent; the conclusions reached are set out clearly and with vigour, and the recommendations are supported by sound evidence. There is one however on which the Government should hesitate before taking action—namely, that the Safety in Mines Research Board should lose its present independent position and come under the direct control of the Secretary of Mines. The whole research organisation would then, it is argued, be an integral part of the department; its staff would be part of the departmental staff, subject to the usual Civil Service rules; interchange and close coöperation would be facilitated between the research staff, the testing staff, and the inspectorate; the choice of subjects in the annual programme of work would fall on the Secretary of Mines. While all this is convincing enough, one important fact seems to have been forgotten. Research work cannot be turned out to order; the instinct for research is akin to the poetic impulse and does not flourish under restraint. One might as well put the Poet Laureate under the Board of Education.

[6] Report of the Departmental Committee on Certain Questions Arising Under the Workmen's Compensation Act. Cmd. 5657. 1938.

RADIOLOGICAL PELVIMETRY IN RELATION TO LABOUR

ALTHOUGH pelvimetry by X rays has now an extensive literature, there is as yet little agreement as to the interpretation of the measurements so obtained in assessing the ease or difficulties likely to ensue in childbirth. The problem is clearly one to be approached by statistical methods, and it is from this viewpoint that it is discussed in a very careful study reported by Dr. Nicholson of 350 cases observed by him at Moreton District Hospital.[1] These patients were almost entirely primigravidæ and were drawn from all strata of society in rural Gloucestershire. The figures cannot be safely applied to the populations of large industrial areas where the incidence of malnutrition, and its effects upon the skeleton, may be very much higher. The sample certainly contains much less than the average proportion of contracted pelves with which the obstetrician has to deal. On the other hand it has the virtue of being homogeneous and practically unselected.

Nicholson first sets out his measurements in detail and their relationships one to another—the conjugate and transverse diameters (which show no relationship one to the other), the pelvic index or the percentage ratio of the conjugate to the transverse, the approximate area at the brim, the antero-posterior and transverse diameters of the outlet and its approximate area, and the pubic angle. He then endeavours to relate these measurements to the events observed in labour, restricting the sample to 250 primiparæ for whom both measurements and details of labour were available. For this purpose he divides the women into five approximately equal groups on the basis of each of their measurements, and determines the proportion in each that had an assisted or unassisted labour. He thus concludes that variation in the pelvic index is, within the limits

[1] Nicholson, C., *J. Obstet. Gynæc.* December, 1938, p. 950.

observed, unassociated with difficulty in labour. The patient with a flat pelvis had quite as good a chance of an easy labour as one with a round or a narrow pelvis or one of any other shape. In his rural population contraction at the brim was also a rare cause of difficulty and he thinks that the line below which normal delivery becomes doubtful should be drawn somewhere about an area of 90 sq. cm. As the approximate area of the outlet declines there is a significant rise in the percentage of assistance, so that there is a clear association between contraction at this level and difficulty in labour. From these figures it seems that at this level too the line between the chances of normal and difficult labour occurs somewhere about 90 sq. cm. An association between narrowing of the pubic angle and difficulty in labour is also obvious, and normal delivery probably becomes doubtful if the angle is less than 75°.

Nicholson's general conclusion is that the great majority of the minor difficulties of labour, so far as these are due to contraction of the pelvis, are due to a contraction at the outlet which is unassociated with any contraction or any alteration of shape of the brim. He makes no claim, of course, that the radiologist must supersede the obstetrician in the judgment as to when a cæsarean operation is necessary, but emphasises that the obstetrician must not neglect precise information about the bony pelvis with which he has to deal. A carefully planned experiment on a larger scale could, he believes, easily and speedily assess the real value of radiological pelvimetry and lay down the criteria in figures on which possible disproportion should be diagnosed.

STERNAL PUNCTURE IN KALA-AZAR

THE organism of kala-azar infects the reticulo-endothelial system and is difficult to demonstrate in the peripheral blood. For purposes of diagnosis therefore recourse has usually been made to puncture of some organ rich in reticulo-endothelial cells, notably the spleen. Splenic puncture, however, is not without risk; for example, Giraud and Gaubert [1] performed it in 300 cases of kala-azar, and on 3 occasions it was the direct or indirect cause of death. From this experience they concluded that all other methods of demonstrating the parasites should be attempted before trying splenic puncture, and that this must be carried out with the strictest precautions, including immobilisation of the patient and rest in bed for twenty-four hours after the operation. Alternative methods of demonstrating the parasite, such as puncture of liver or lymph-gland, or trephining of the tibia, have long been used, but more recently the value of sternal puncture has been widely recognised, and several workers, including Kassirsky,[2] Lorando,[3] d'Oelsnitz,[4] Schretzenmayr,[5] Schretzenmayr and Lancaster,[6] and Huei-Lan Chung,[7] have reported on it. This last author, after 350 punctures without accident, writes that the method is simple and safe and can be used repeatedly without risk on all patients suspected of kala-azar, including those with hæmorrhagic tendencies; and it can obviously be used in early infections where the spleen is small or not palpable. Furthermore, whereas splenic puncture cannot be performed safely unless the patient is in hospital, a large proportion of Chung's punctures were made either in the out-patient department or during a field survey.

[1] Giraud, P., and Gaubert, *Arch. Méd. gén. colon*, 1938, **7**, 1.
[2] Kassirsky, J. A., *Arch. Schiffs- u. Tropenhyg.* 1932, **36**, 492; *Ibid*, 1933, **37**, 496; *Folia hæmat., Lpz.* 1933, **51**, 352.
[3] Lorando, N., *Bull. Soc. méd. Hôp. Paris*, 1937, **53**, 314.
[4] d'Oelsnitz, M., *Mourem. sanit.* 1938, **15**, 220.
[5] Schretzenmayr, A., *Arch. Schiffs- u. Tropenhyg.* April, 1938, p. 149.
[6] Schretzenmayr and Lancaster, R. L., *J. trop. Med.* (*Hyg.*), 1938, **41**, 341.
[7] Chung, H., *Chin. med. J.* November, 1938, p. 397.

AN AFRICAN SURVEY

IN future no one in search of information on any aspect of African affairs can do better than begin by consulting Lord Hailey's massive volume.[1] The book is unique. It is nothing less than a study, planned and completed on a grand scale, of the problems arising in the whole of Africa south of the Sahara (with the exception of Liberia and the Sudan). Having spent most of his life in India, Lord Hailey brought to his task a mind familiar with the difficulties of administering non-Western peoples and especially alert to detect analogies between British policy in India in the past century and in Africa now. Experts of all kinds assisted him in gathering the enormous amount of material he has drawn upon.

Medical readers will find there a concise history of medical work in the continent, followed by a catalogue of its principal diseases, and a brief description of how health services are organised in British, French, Belgian, and also in Portugese territory. It is Lord Hailey's discussion and comparison of British and French methods that will perhaps attract most attention. The British, he tells us, tend to rely on a series of hospitals with outlying dispensaries. To establish such a system in colonies that cover vast areas is a costly enterprise, and Lord Hailey is doubtful whether we can justify the expenditure involved unless by the plea that hospitals provide clinical material for teaching purposes. The French, by contrast, are content to maintain only a few first-class hospitals and a few medical centres with dispensaries attached, and to rely mainly on mobile detachments for dealing with epidemic diseases. They spend much less on buildings and equipment generally and even the food is often brought by the family of the patient. So far from impairing the popularity of medical treatment with Africans, the simpler and more homely way seems to overcome more readily their reluctance to trust the white man's "magic," whereas the discipline and comparative isolation of British hospitals may increase it. Another advantage of the French system is that it lends itself more easily to the mass attack which is essential in coping with the diseases that affect the mass of the people and that cause most mischief. In such circumstances it is clearly not enough to multiply facilities, however good in themselves, for treating such individuals as come for relief. Nigeria is indeed contemplating the use of French methods in areas affected by sleeping-sickness. This is not to say that Lord Hailey condemns the British way out of hand. He recognises that, in the absence of any comprehensive expert inquiry on the subject, he would not be justified in trying to generalise about the relative merits of the two systems; but, quite apart from any comparison, he finds it "difficult not to desire to see in some of the British territories more evidence of the spirit which shows itself in a direct attack on the health problems of the people."

Planning to expand health services in Africa is hampered by the sad lack of vital statistics. Although Lord Hailey has made use of the latest figures and particularly of all R. R. Kuczynski's work, he concludes that "in the present state of our knowledge,

[1] An African Survey. By Lord Hailey, G.C.S.I., G.C.I.E. London: Humphrey Milford, Oxford University Press. 1938. Pp. 1837. 21s.

it is only possible to say that the African population is probably now either stationary, or subject to a very slow increase." Official assumptions about the extent of infantile mortality cannot be confirmed nor can one estimate the effect on the birth-rate of certain native customs. The difficulties of enumeration among primitive peoples are manifold and consequently census returns are by no means reliable. Now that preparations for the 1941 census in British Africa are afoot, the time has surely come to try the method of sample surveys as an addition to a technique that has hitherto failed to produce satisfactory results.

SOME NERVOUS COMPLICATIONS OF CHEMOTHERAPY

IN a leading article on August 13th we referred to some of the unpleasant complications occasionally arising from the use of Uleron for gonorrhœa, and on Oct. 15th we published an example of peripheral neuritis attributed to this cause. Further examples appear in the *Dermatologische Wochenschrift*, where Schubert [1] records the case of a young man who was cured of gonorrhœa by taking uleron but developed acute transverse myelitis of the spinal cord a fortnight later and died after another month. Autopsy established "softening" (myelosis) of the cord, and although there is a suspicion of over-dosage before admission to Schubert's clinic, and the issues of this case are further complicated by the onset of symptoms having coincided with the hardships of a long ski tour, the facts appear significant. They become more so when read in conjunction with another report of transverse myelitis, with recovery [2] and with a summary of 31 collected cases of paresis of the legs [3] possibly attributable to the drug. It is suggested that the risk of complications may be relatively greater in children than in adults.

WHITHER THE ALMONER?

THE 29th report of the Cecily Northcote Trust before us is an example of how "the ideal of organised and comprehensive social care for all patients" may become an integral part in the life of a hospital. The phrase taken from the text of the report is the modern equivalent of Sir Thomas Browne's: "There are infirmities, not only of body but of soul and fortunes, which do require the merciful hand of our abilities." A series of case reports shows the almoner at St. Thomas's Hospital not only inquiring into means and assessing payments but also giving the patient that social help contemporaneous with and shaped by medical treatment which is so necessary in most cases for carrying out the recommendations of the medical staff. Careful study of the individual patient in hospital helps to show his existence not as a series of unconnected crises but, in the main, as an inexorable sequence of cause and effect. This is a big task already, but the new Westminster Hospital envisages yet another sphere of work for the almoner. Mr. Rock Carling proposes that in the out-patient department to be opened in the coming May it should be the almoner's task to organise the consultations and subsequent treatment. She is to arrange the work by appointment and if, by a slip, a patient should arrive on the wrong day, it would fall to her to get one of the whole-time medical staff to make preliminary investigation, pending consultation with an honorary. But that is not all. At the recent annual school dinner the chairman described a plan of decentralised organisation in which a social welfare office under the direction of an almoner would be placed on each floor of the hospital. She would then have the threefold duty of (1) providing the honorary concerned with a preliminary report from the practitioner together with such other information as may be necessary; (2) arranging the visit so as to reduce waiting to a minimum; (3) finally supplying the practitioner with a report. To these duties the chairman added yet another—that of arranging for the patient's admission to hospital. These cumulative functions will place upon the almoner in the new Westminster a great weight of responsibility. At a first glance she seems to be the most suitable person for the job, since she is in touch with all departments of the hospital and knows what hospital attendance means to the patient. Whether it is altogether a step in the right direction remains to be seen. Inquiry into means has probably gone far enough and the almoner's training fits her for administration. But reporting to local doctors and arranging admission to the wards are medical matters, and anything that weakens contact between hospital staff and practitioner is to be deprecated. The almoner should not claim medical knowledge, nor is it in the hospital's interest to employ her on work which does not use her special knowledge of social problems. It looks as though the honorary staff could do with efficient secretarial assistance, without taking the almoner off the medico-social work which is her primary function. Actually the taking of social histories is increasing in the same ratio as the realisation of the effect of environment on the patient's condition. It is this part of the almoner's work which is essential to the medical staff. Coöperation between medical and social welfare units should ensure a well-balanced team.

[1] Schubert, M., *Derm. Wschr.* Nov. 19, 1938, p. 1361.
[2] Lilienthal, W., *Ibid*, July 9, 1938, p. 833.
[3] Döllken, H., *Ibid*, Oct. 29, 1938, p. 1273.

RELIEF OF PAIN IN ARTHRITIS

FOR many years Leriche and others on the Continent have been in the habit of injecting local anæsthetics into or around joints in order to relieve the pain of chronic arthritis and kindred conditions. The relief obtained in this way lasts considerably longer than would be expected and can be further prolonged by the use of oily solutions which are absorbed slowly and allow a gradual liberation of the anæsthetic. It has also been found that when the pain returns it tends to be less severe, and that after one or more injections the relief is sometimes more or less permanent. The explanation of this is doubtful, but such drugs as procaine clearly produce an analgesia that long outlasts their anæsthetic effect, and it has been suggested that they act by interrupting some reflex vicious circle of pain, spasm, and congestion. In the last four years Tarsy [1] of Brooklyn has treated 172 cases of chronic painful conditions in and around joints by local and regional injections, and he reports that 126 of these were improved, most of them very definitely, and that in many the improvement has been maintained for from one to two years. He used either a 1 per cent. solution of procaine or a solution of Eucupin in oil. He recommends the former for general use because of its ease of administration, the oily solution being reserved for intractable cases. The method is most satisfactory in degenerative and traumatic rather than in infective arthritis, though Tarsy obtained a few exceptionally good results in rheumatoid arthritis,

[1] Tarsy, J. M., *Med. Rec.* Oct. 5, 1938, p. 269.

and it is not suitable for extremely debilitated or apprehensive people or those with uncompensated diabetes or heart lesions. For the first day or two after injection there may be some local stiffness or swelling, but Tarsy had little trouble from reactions and saw none of the sloughing with the oily solution that has been reported in the treatment of pruritus ani.

The injections are made into the point of maximum pain. A weal is raised over this point and 2–5 c.cm. of the aqueous solution or 1 c.cm. of the oil is then injected close to the periosteum, care being taken not to pierce the joint capsule. In arthritis of the knee the injections are given at seven sites, two or three at each sitting, five being around the capsule, one in the popliteal fossa, and one under the patellar ligament. Some cases do better when the injection is given into the joint. Tarsy found that 10 c.cm. of eucupin given in this way produced severe local and general reactions and he does not now give more than 0·5–2 c.cm. No ill effects arose from the injection of procaine into joints. Many of Tarsy's cases had brachial, intercostal, lumbar, or sciatic neuralgias, and in these relief was obtained from nerve-block. Here the technique is rather more difficult, and Tarsy advises that these delicate procedures should be approached with caution. Usually, however, the method is simple, and devoid of danger. Tarsy claims that, while not a complete therapy in itself, it forms a valuable accessory to physiotherapeutic and other more radical measures.

HERMAN BOERHAAVE

THE University of Leyden has recently celebrated the bicentenary of the death of Boerhaave, and the festival has served as an occasion for a re-estimation of the true greatness of the Dutch physician. In his life-time, and in fact from a comparatively early age, he was a giant out-topping in celebrity not only his contemporaries but the great majority of his predecessors. Indeed some of his followers so exalted his merits that in their eyes in him medicine was reborn and raised to a new heaven of excellence; and their enthusiasm extended his influence over the whole civilised world not merely during his life-time but for several generations after his death. That so grandiose a reputation should suffer some eclipse was inevitable, and in the nineteenth century Daremberg of Paris questioned his pre-eminence. "The Aphorisms and the Institutiones possess neither profundity, nor anything that surpasses the ordinary human understanding," he wrote. "It would even appear to me that the elucidations of the pupil van Swieten are of much greater value than the text of the teacher."

Now Dr. Schoute,[1] in an oration at Leyden, has examined afresh the almost miraculous growth and persistence of Boerhaave's fame. It was due, he contends, to the fact that Boerhaave early in his career had precisely formulated a course of medical education that was not only revolutionary but so eminently reasonable, and so attractively elaborated by the master, that no student of the art could fail to grasp its superiority to the established usage. Hence came the enormous influx of students to Leyden from the whole world, including many from this country, and the resounding glorification of their teacher. This revolution, Dr. Schoute holds, was neither more nor less than the decisive passage from the medicine of authority to the medicine of precise and accurate observation, founded on a sound preliminary training in mathematics, on which Boerhaave strongly insisted, chemistry, anatomy, and pathology, succeeded by careful accuracy at the bedside and painstaking dissection in the dead-house. Thus interpreted Boerhaave takes a new place in the Hall of Fame, and must be regarded as one of the earliest founders of modern medicine.

[1] Commemorative speech delivered in the Aula of the Leyden University Hospital on Sept. 23, 1938.

B.C.G. VACCINATION IN SWEDEN

IN September, 1927, the Swedish National Association against Tuberculosis undertook a carefully planned campaign of vaccination of the new-born against tuberculosis with B C G. The campaign was carried out in Norrbotten, a county in the north of Sweden where tuberculosis has for long been very prevalent. The vaccine was given by the mouth in three successive doses as a quite voluntary measure, the cost of which was borne by the association. This large-scale experiment has now been in operation for ten years and Prof. Carl Naeslund[1] of Stockholm has attempted to draw conclusions from it. By the end of 1937 13,103 babies had been given B C G at birth, whereas the parents of 34,845 babies had declined treatment. The proportion vaccinated varied considerably from year to year, and the Lübeck disaster reduced the percentage in 1931 and 1932 to a little over 20.

Prof. Naeslund has disregarded morbidity-rates as an index to the action of B C G and has confined himself to the less questionable evidence of mortality-rates. In the ten-year period there were 754 deaths from all causes among the vaccinated (6·10 per cent.) and 3501 deaths among the controls (11·17 per cent.), calculated on the basis of the number of children surviving at the beginning of 1938. The greatest difference between the two groups was observed during the first year of life when the rates were 5·97 and 9·71 per cent. respectively. After the age of 7 years there was hardly any difference between the two groups. When the deaths from various infectious diseases were considered by themselves, it was found that the mortality-rates were higher for the B C G children than for the controls—an observation that disposes of the notion that B C G confers a certain non-specific, blunderbuss immunity. The calculations with regard to the tuberculosis mortalities were to a certain extent vitiated by the lack of confirmatory post-mortem examinations and the smallness of the figures. With these reservations it is noted that the tuberculosis mortality for the B C G children was 1·5 per 1000 compared with 6·3 per 1000 for the controls, the actual number of tuberculosis deaths in the two groups being 18 and 199 respectively. Prof. Naeslund has also shown that the decline in the tuberculosis death-rate in the period investigated was much more definite in Norrbotten than in the neighbouring counties. He concludes that B C G vaccination has seemed to effect a remarkable diminution in tuberculosis deaths, and that, whatever may be the explanation, there has also been an obvious fall in general mortality among the vaccinated.

[1] *Nord. med. Tidskr.* Dec. 17, 1938, p. 1990.

THE SIZE OF RED CELLS IN ANÆMIA

IN 1933 Price-Jones summarised the then available knowledge of the significance of variations in red-cell diameters.[1] Dr. Erik Mogensen [2] has now made a further review of the literature of red-cell measurement, to which he has added many fresh observations of his own. He concludes that the Price-Jones or red-cell distribution curve of Addisonian pernicious anæmia may be split into three components. The first is a main component, consisting of large blood-cells, which includes the majority of the cells: the standard deviation of this main component ordinarily exceeds the largest normal standard deviation but is not very large, the characteristic large deviation of the whole curve being dependent on the presence of one or two minor components. The second (which is always present) is a left component consisting of small cells; and the third (which may be lacking) a right component made up of extremely large blood-cells. A curve of this last type was found, apart from Addisonian pernicious anæmia, only in cases of megalocytic hyperchromic anæmia, associated with idiopathic steatorrhœa, which responded to liver extract. Five cases of megalocytic anæmia in association with liver disease showed only a slight increase in standard deviation and a homogeneous curve. Further analysis of four cases of achrestic anæmia published by Israëls and Wilkinson [3] in 1936, though they showed an increased standard deviation, proved that three of them had homogeneous curves with no left component, while the fourth, which was more typical, had at times responded to liver extract. Mogensen believes therefore that achrestic anæmia is not due to deficiency of the pernicious-anæmia principle, but has some other origin. He suggests that though the characteristic type of curve he has described is not specific for Addisonian pernicious anæmia, it is nevertheless the result of a specific anæmic condition—namely, that caused by lack of the pernicious-anæmia factor, no matter what the cause of this deficiency may be. It would be of particular interest to have an analysis of the component parts of the curve in those cases of megalocytic hyperchromic anæmia that respond to Hepastab and Campolon, but not to anahæmin—that is to say, the nutritional megalocytic anæmia observed in India by Wills and in Macedonia by Hamilton Fairley. In straightforward iron-deficiency anæmia Mogensen found a curve of normal structure showing a reduction in mean diameter and some increase in standard deviation.

NEW LIGHT ON CORTICAL ACTIVITY

INVESTIGATION of cortical activity by the electro-encephalograph has opened up a wide field for exploration, and already papers are appearing pretty fast in the neurological journals. Rubin and Cohen [4] have recently called attention to the possible value of electro-encephalography in the diagnosis of bromide intoxication by a study of the alpha rhythm. This rhythm is normally recorded at a rate of about 10 cycles a second from the occipital lobes, when the subject's eyes are closed. In a case of bromidism which they observed the frequency was definitely lower (8·3 per second) when the blood bromide was as high as 59·6 mg. per 100 c.cm. As the blood bromide lessened under treatment the alpha frequency rose, until at 36·4 mg. it was 10·9 per second. At the same time the percentage of the record occupied by the alpha rhythm, and the amplitude of the alpha cycles also rose. The authors give reasons for their belief that alpha frequency occurs at the optimum physiological rate, and that a lowered frequency means decrease in metabolism in cortical cells. In other words an amount of bromide sufficient to reduce alpha frequency means bromide intoxication. The electro-encephalogram would thus help us to an easy decision whether bromide intoxication was or was not present. This paper deals with only one case, and confirmatory observations are required.

Grinker, Serota, and Stein [5] have observed and reinterpretated myoclonus epilepsy in the light of electro-encephalographic findings. They have taken electro-encephalograms of five members of a family suffering from typical familial myoclonus epilepsy of Unverricht. Before an ordinary major fit there are often rhythm disturbances, of increasing quality and frequency, which lead up to the fit. These are not accompanied by objective manifestations, and have been termed subclinical seizures. In myoclonus epilepsy there are small bursts of rapid spike waves which, increasing in amplitude and duration, lead up to the major fit, and these spikes synchronise with the typical lightning muscle spasms of the disease. They resemble the rapid spike waves of the clonic stage of a major fit, and seem to originate in the frontal lobe and radiate over the cortex.

In some ways myoclonus and petit mal ("absences") seem to be variants of major attacks in opposite directions. In petit mal the waves are slow, consciousness is blurred or absent, and there are usually no muscle twitchings. In myoclonus the waves are fast, consciousness is retained, and muscle twitching is the cardinal feature. Hyperventilation increases petit mal waves, while in myoclonus it produces only slow waves. The focusing of attention diminishes petit mal waves and the liability to attacks, while in myoclonus attention and voluntary movement have the opposite effect. On theoretical grounds therefore one would expect that phenobarbital and sedative drugs would be useful in myoclonus, and stimulants in petit mal. Phenobarbital is certainly effective in myoclonus, but it is often equally effective in petit mal, while stimulants, of which Benzedrine (amphetamine) is the drug of choice, diminish or abolish the attacks only in exceptional cases.

Dr. J. H. HARLEY WILLIAMS, medical commissioner of the National Association for the Prevention of Tuberculosis, has been appointed secretary-general of the association in succession to Lieut.-Colonel E. D. Caddell, M.C., M.B.

[1] Price-Jones, C., Red Blood Cell Diameters, London, 1933.
[2] Mogensen, E., Studies on the Size of the Red Blood Cells. London: Humphrey Milford, Oxford University Press. 1938. Pp. 216. 12*s.* 6*d.*
[3] Israëls, M. C. G., and Wilkinson, J. F., *Quart. J. Med.* 1936, **5**, 69.
[4] Rubin, M. A., and Cohen, L. H., *Arch. Neurol. Psychiat., Chicago*, November, 1938, p. 922.
[5] Grinker, R. R., Serota, H., and Stein, S. I., *Ibid*, p. 968.

PETER CAMPER.—On April 29 and 30 the University of Groningen is to commemorate the 150th anniversary of the death of Peter Camper, the great physician, anatomist, obstetrician, and artist, who for ten years was professor of medicine at the university. There will be an exhibition at the Academic Hospital at Groningen of Camper's drawings of anatomical and anthropological subjects and of the sketches he made during his European journeys. A number of his anatomical preparations, which happily escaped destruction in the fire at Groningen University in 1906, will also be on view.

THE AIR-RAID

A series of articles on medical organisation and surgical practice in air attack by
P. H. MITCHINER, C.B.E., T.D., F.R.C.S., *and* E. M. COWELL, D.S.O., T.D., F.R.C.S.

I—ORGANISATION OF MEDICAL AID

WAR surgery may expect to deal chiefly with civilians of both sexes rather than with members of the fighting services. For this purpose a vast air-raid precautions organisation is necessary. The medical services will require an immense personnel; in crowded areas a proportion of 1 doctor to 50 civilians may be necessary. The medical profession is probably the best organised section of the community in this country. Thanks to the efforts of the British Medical Association a register of all doctors has been compiled, indicating what service each doctor is prepared to render in the event of a national emergency. Some 90 per cent. of the profession, whether members or non-members of the Association, had replied by the end of July (1938) and the register was brought up to date again in the recent crisis. Further steps in this organisation should be undertaken. The doctors should be notified in peace time as to how they may be employed, not only in what capacity but also in what locality. These volunteers include doctors with service experience and large numbers of medical men belonging to a new generation, who have no knowledge of the treatment of war wounds, the management of large numbers of casualties, or air-raids. These articles are addressed primarily to the latter.

The Ministry of Health has set up a special department to prepare hospital accommodation, to advise on equipment, and to control medical personnel. Under this A.R.P. scheme London and the Home Counties have been divided into three zones. In a crisis the inner-zone hospitals will remove their ordinary patients to make room for mass surgery, evacuating the wounded to the outer zone as soon as possible after operation. The outer-zone hospitals will be placed in situations of reasonable safety and will act as base hospitals. Some of them will be set apart as special centres—neurological, orthopædic, and so on. The control of all these arrangements will be in the hands of a specially deputed medical officer at the Ministry, with presumably regional decentralisation.

MEDICAL PERSONNEL

As regards the administration of each unit, it is most important that the right doctor be chosen as senior medical officer (S.M.O.). This official, with his deputy, should have all the qualifications necessary to carry on under every conceivable difficulty and at times in face of danger. The S.M.O. must have personality, preferably war or service experience, tact, and tireless energy. He must be a good organiser, know A.R.P. thoroughly, and be prepared by his example of fearlessness to quell panic, inspire devotion to duty, and when necessary take the responsibility of making important decisions, either after reference to higher authority or on his own initiative. Although these medical units are composed of a civilian personnel and are not military dressing stations or hospitals, it is essential that an atmosphere of discipline be created. Medical officers should wear some kind of distinctive uniform, even if only an armlet. In air-raids panic may be produced, and in controlling crowds of patients and perhaps a frightened personnel the appearance of officials in uniform undoubtedly has a quieting and beneficial effect.

To correlate details of professional technique, to give experienced advice in difficult cases, and to impart the special knowledge necessary for the treatment of war wounds, senior members of the profession should be appointed and recognised as consultants. These appointments should be made now, in peace time. One consultant will probably be responsible for a group of hospitals. Each hospital staff should also appoint and recognise a senior surgeon, who will act in an advisory capacity in his own hospital. This will secure some uniformity of surgical procedure, and the senior surgeon will always be at hand to operate on any particularly difficult case.

All members of the profession, whether specialists or general practitioners, should now prepare themselves for the part they may be called upon to play in a national emergency. The Home Office has already educated many doctors and nurses in "gas." The professional study of the problems of war wounds due to air-raids is equally important. Large numbers of doctors are required to lecture and train the new medical personnel provided by the voluntary aid societies of the Order of St. John and the British Red Cross Society and those members of the public who have volunteered direct to the local authority. A good voice, carefully chosen words, personality, and a knowledge of the art of teaching are as essential as familiarity with the subject. In many instances it would be desirable that the instructors themselves be instructed before being allowed to lecture, as is the case with "gas." Doctors should interest themselves in the practical side of first-aid teaching and not be content with handing over this part of the training to a layman. Apart from doctors in charge of administration, many surgeons and anæsthetists will be required. Surgical assistants may be obtained by training senior medical students and dental surgeons. Doctors will be required in the reception departments of these A.R.P. medical establishments. This work is very responsible and calls for both quick judgment in diagnosis and clinical insight.

When the non-effectives are evacuated, conditions of medical practice will be greatly disturbed. Very many women and children will be sent to the country from industrial centres, where crowded conditions may cause serious epidemics, needing extra hospital accommodation and extra medical and surgical staff. It will also be necessary to reinforce the staffs of the medical officers of health in these refugee districts by extra doctors and sanitary inspectors.

Medical units must be provided in all vulnerable spots and arrangements made to reinforce attacked areas by mobile sections from areas free from attack. The headquarters staff of each local authority should coördinate and control the following services: (1) police; (2) fire; (3) engineering, including rescue and demolition, water, gas, and electricity repairs, sewage disposal, repair and decontamination of roads, and provision and repair of protective trenches; (4) air-raid wardens; (5) medical; (6) transport; (7) communications, intelligence, and warning signals; and (8) evacuation.

The following units will be required to deal with casualties: (*a*) police, wardens, and others who render immediate first aid; (*b*) first-aid parties, made up of medical volunteers; (*c*) casualty posts; (*d*) dressing stations; (*e*) casualty clearing hospitals (centres for mass surgery); and (*f*) base hospitals.

All A.R.P. personnel should possess an elementary knowledge of first aid, including arrest of bleeding and the application of splints and shell dressings. These dressings should be available in large quantities for use by persons called on to render first aid. Every soldier on active service carries his own dressing, and civilians should be encouraged to do the same.

FIRST-AID PARTIES AND DRESSING STATIONS

Having received first-aid treatment at the earliest possible moment, the casualties are collected by first-aid parties, each consisting of four bearers, as laid down by the Home Office. These parties will be in readiness at the dressing station or other recognised depôt. In a well-organised town there is one warden's post for each 250 inhabitants. These posts should be in telephonic communication with a controlling centre and may be fitted up as casualty posts holding small supplies of dressings, splints, a few stretchers, and blankets. Casualties may be collected and brought to these posts by the first-aid parties and thence, after necessary attention, evacuated to the dressing stations by ambulance cars. An effective system of communication is essential. If the telephone service breaks down short-wave two-way wireless sets or a supply of runners should be available. If there are sufficient doctors, one should be on call for, say, each 30 casualty posts, to supervise the work of the first-aid parties and to give morphia to casualties trapped under fallen debris.

Each party should be provided with a gas-proof haversack fitted with a zip-fastener. The following contents are suggested: 12 shell dressings, 12 triangular bandages, 2 sets of splints, 1 tourniquet, 1 electric torch and refill cell, 2 pairs of stout scissors, a note book, and a pencil. Members of the first-aid parties wear protective clothing and are provided with steel helmets and respirators. If there is a shortage of men, a proportion of women may be enrolled for this work and will be useful in dealing with casualties among the women and children.

All casualties should be taken to the nearest dressing station and *not* to a hospital direct. Full details of the organisation of these establishments will be found in Home Office publications. The official name for this medical unit is "first-aid post," and the original plan visualised a short stay only at the posts, which were to be entirely under lay control. These ideas are being revised, however, and it is suggested the term "dressing station" is to be preferred. A doctor will be in charge of each station, and besides the voluntary personnel medical officers and nurses will be available.

The problem of an efficient lay-out is complicated by the possibility of gas casualties and the presence of both sexes and all ages. Schools are the most adaptable and in most localities are already prepared to be taken over as first-aid posts at short notice. Some of the smaller civil hospitals will be more suitable for dressing stations, and some of the larger hospitals will be in too dangerous a position to act as surgical centres and can also be used for this purpose. In a large town it is impossible to find an absolutely safe site. Proximity to railway centres, power stations, gas works, and factories should be avoided; but dressing stations are required to be near the spot where casualties are expected. Alternative sites should always be in reserve, in case existing establishments are damaged. Casualties may have to be handled at night under black-out conditions. Dull illumination signs should be prepared, entrances for ambulance cars be widened if necessary, and plans made for simultaneous admission and evacuation, with entrances and exits clearly marked "in" and "out" respectively to allow the ambulances to load or unload without turning. Attendants in uniform should be on duty at the gates, with orders to prevent any panic, to direct traffic, and to guide walking patients. So that the stream of casualties should proceed smoothly, direction signs should be painted on the floors or walls and all departments clearly labelled.

A large dressing station should be designed to accommodate 100 lying and 200 walking cases. It is most important that these two categories be kept apart. It may be necessary to duplicate the lay-out for the sexes or merely to separate them by a line of movable screens. It may not be possible to evacuate a dressing station for many hours, and arrangements must be made to feed the patients and make them as comfortable as possible. The following departments should be allowed for, and clearly marked by notice boards:—

(1) Stretcher and blanket dump, at entrance.
(2) Reception (canteen, clerks, antitetanic serum). M.O. to sort cases. Duplicated for gas cases.
(3) Treatment for minor cases only.
(4) Dressing-room for serious cases (operating theatre). Operations only of extreme urgency should be done here.
(5) Resuscitation (and blood transfusion). (Beds.)
(6) Evacuation, walking cases; evacuation, stretcher cases.
(7) Office for M.O. in charge. (Clerks and duty officers, St. John or Red Cross.)
(8) Stores for quartermaster (supplies and equipment, patients' valuables, clothing, &c.).
(9) Kitchens. Feeding for patients and personnel.
(10) Quarters for personnel, dining-rooms, washing, and changing.
(11) Waiting-room for friends.
(12) Mortuary.
(13) Trenches for protection of walking wounded and personnel.

The personnel consists of four doctors, four trained nurses, and members of a voluntary aid society, details of which will be given in a subsequent article. If the work lasts more than twelve hours, a second shift will be required. A casualty card in a waterproof envelope will be made out and attached to each patient. On this will be entered details of the wound and administration of serum, morphia, or other drug. This card will accompany the patient when he is evacuated. It is neither advisable nor possible to segregate different types of surgical cases at this stage. Unwounded gas cases if slight may be sent home after treatment, with orders to report to their own doctors or a hospital next day. "Shell-shock" cases should be evacuated direct to a special neurological hospital, unless they are wounded.

CASUALTY CLEARING HOSPITALS

Certain existing hospitals will be organised to deal with large numbers of casualties. Experience in the Great War showed that the best results were obtained by opening groups of hospitals and admitting convoys of 150 lying cases to each in turn. Walking and sitting cases are more conveniently dealt with at separate hospitals. From the point of view of

risk of bombing, no single building should accommodate more than 200 cases at a time. A hospital with room enough for 200 patients should be able to receive convoys of 150 at a time. The bulk of the patients remain on their stretchers; 75–100 actual beds are required. Most of the patients can be made comfortable on their stretchers. All wards and departments should be clearly marked and frequent direction signs be displayed. To save labour and to give protection, the main departments should be on the ground floor. They should be planned so that the casualties are moved on in a definite sequence, like goods in a mass-production factory. The following departments will be necessary, the sexes being dealt with as in the dressing stations:—

(1) Entrance for ambulance cars, with easy get-away and separate entrance and exit.

(2) Stretcher and blanket dump.

(3) Offices for S.M.O. and clerks, house governor, matron, &c.

(4) Reception room, duplicated for wounded and on a smaller scale for gas cases.

In the reception room for wounded accommodation should be provided for 40 stretchers and 20 sitting cases. An experienced doctor examines all cases, looking for penetrating abdominal or chest wounds, which may have been previously missed, signs of nerve injuries, and so on. The envelopes of casualty cards are marked in chalk with the destination of the patient, and priority cases are selected. On information received of the numbers of casualties expected and the number of surgical teams available, a decision is reached as to how many cases to send for operation and how many to evacuate at once for operation at the next hospital. A rough guide is given in table I.

TABLE I—OPERATION FIGURES (CONVOY OF 150 CASES)

Class of operation	*Percentage*	*Number*
Total requiring operation	60	90
To save life	15–20	23–30
To save limb	20–40	30–50
To save man-power	40–60	50–90

The first class in table I contains many patients who are moribund or suffering from such injuries as surgery cannot assist. The second class includes abdominal injuries and wounds of blood-vessels. Many of the third class can wait 12–24 hours, but only at the risk of subsequent amputation. The fourth group is really the most important. Early surgery ensures early restoration of function and therefore does not deplete the ranks of industrial workers.

TABLE II—NUMBER OF TEAMS REQUIRED TO DEAL WITH A GIVEN NUMBER OF CASUALTIES

No. of teams	*Operations per hour*	*Operations in 10 hours (with rest)*
1	1·8	15
2	3·6	30
3	5·4	45
4	7·2	60
5	9·0	75
6	10·8	90
7	12·6	105
8	14·4	120

The other figures required to regulate the supply to the theatre department are the number of surgical teams available and their performance per hour. A skilled practised team may be expected to operate on 1·5 to 2 cases per hour. With 1·8 cases per hour as an average, table II shows the number of teams required to deal with a given number of casualties.

Careful records must be kept of all casualties, whether trivial or serious, that pass through each medical unit. A casualty card in a waterproof envelope will be prepared at the warden's post (casualty medical post) or dressing station and accompany the patient to the casualty clearing hospital and outer-zone hospital, appropriate notes being added at each hospital. As each patient is admitted, a slip, bearing a serial number, should be pinned on the card. These slips are collected on evacuation and provide a useful method of checking numbers. Identification of unconscious patients and the dead will be difficult unless some universal system of identity discs is introduced. Casualty returns will be required for (1) the direct information of relations, (2) the headquarters of the local authority, (3) the Ministry of Health, and (4) the Ministry of Pensions, and duplicates will be kept at the hospital concerned. Records even of the most trivial injuries must be kept so that claims arising at a later date may be dealt with.

A team of orderlies and nurses should be available in the reception room to give antitetanic serum to all patients with flesh wounds who have not received an injection at the dressing station, remedies being at hand to deal with anaphylaxis. This must be given as a routine to all wounded and an entry stamped on the casualty card. A canteen should be available to supply hot drinks, biscuits, chocolate, and cigarettes, and milk and sweets for the children. Casualties having been recorded, sorted, and given serum are passed on to the resuscitation ward or the pre-operation ward. Only the slight cases should be sent to the evacuation ward.

Cases contaminated with mustard gas or with lewisite are admitted by a separate entrance into the gas reception room and put through a series of undressing-, cleansing-, and dressing-rooms. In the last rooms they are checked in and then join the main stream, being sent on to the treatment, resuscitation, or pre-operative department as required. Care must be taken to identify any contaminated clothing and valuables removed from the patients.

From the reception department a few minor injuries may be sent on for re-dressing, and simple fractures may be splinted after being radiographed (if pressure of work permits). These casualties are then ready for the evacuation department.

The resuscitation ward is a very important department. Thirty beds should be available, with experienced doctors, nurses, and assistants on duty. It should be provided with all the apparatus for blood transfusion and gum-saline infusion, hot-air cradles, and devices for combating shock.

In the pre-operation ward room for at least twenty stretchers will be required for each sex, and ten actual beds should be available for the more serious cases, since they may have to wait several hours before their turn for operation comes. In this ward the patients are put into pyjamas, made comfortable, and given pre-operative medication with morphia or one of the barbiturate group. Clothes and boots are tied in bundles, labelled, and either sent to store or, better, put on the stretcher as a pillow for the patient. Personal valuables are put in labelled linen

"Dorothy bags" or stout paper bags and accompany the patient. Priority cases are kept apart, and the theatre is notified hourly of the numbers awaiting operation. This ward should be as near as possible to the theatre and will be visited at short intervals by the senior surgeon.

MASS SURGERY

The clearing hospital is the unit on which the success of mass surgery depends, and it is the careful organisation of the theatre block which in time determines the successful working of the hospital. The central controlling authority will provide enough surgical teams, including a sufficient auxiliary personnel. The responsibility for organising the work in the theatre should rest with the senior surgeon, working with the S.M.O. Very few hospitals contain sufficient theatre accommodation to permit of mass surgery. Moreover, the present theatres, with their skylights and large windows and usual situation on the top floor, are entirely unsuitable for work in air-raids. Either additional huts may be erected in the hospital grounds, large wards may be taken over as big theatres, or large buildings may be found in the hospital precincts or in the immediate neighbourhood. In these adapted theatres care should be taken that the drains for the disposal of waste water are in order. There must be a supply of water, preferably hot and cold; but it is *not* necessary to make elaborate plumbing arrangements. Two sunk Nissen huts 60 ft. by 20 ft. may be erected as theatres and a third 40 ft. by 20 ft. as a sterilising and preparation room. These can be rendered gas-proof and splinter-proof and may be provided with self-contained lighting sets. In peace time they provide useful store rooms for the extra equipment required by the hospital. The performance figures of a well-trained team (see table II) are only possible if each surgeon is provided with two operating tables (twin-table system described below) and the necessary theatre equipment and furniture.

The team should consist of nine persons: surgeon, assistant (junior surgeon, medical student, or dentist), anæsthetist (occasionally duplicated), sister, two trained orderlies (male or female), two stretcher bearers who may also act as untrained helpers, and one clerk to function for two or more teams. Teams will be classified as "A" Senior, prepared to undertake head cases, abdominal wounds, and chest operations, and "B" Junior, to deal with the simpler wounds.

In any given wound operation the greatest part of the time is taken up in the induction of anæsthesia, cleaning up the damaged parts (often multiple), adjusting dressings and splints, and taking the patient to the ward. Much time can be saved if the preliminary details of the operation are carried out on the second of the twin tables, while the surgeon is doing the main part of the previous operation on the first table. As soon as possible the operator leaves the first table, where the assistant and orderly apply the dressings, and begins work on the second table. By the time the first patient has been taken away to the ward and a fresh patient has been prepared, the anæsthetist can be spared to start the new induction. A surgeon who works rapidly can, indeed, keep up with two anæsthetists, provided his assistant is sufficiently competent. Thus the performance-rate can be increased from 1·5 to 2·5 cases per team per hour. Notes are dictated to the clerk and details entered on the patient's casualty card and in the operation book in all cases.

Most of the patients go straight from the operating theatre to the evacuation department on their stretchers. Here they recover from their anæsthesia, are kept warm and comfortable, and are ready for evacuation in a few hours. Accommodation for 10 sitting and 40 lying cases (33 stretchers and 7 beds) for each sex—i.e., total accommodation for 100 cases—should be provided in the evacuation block. A medical officer should be in charge and should inspect all patients before evacuation.

Some 10 per cent. of patients after operation will not be ready to be moved for many days, and among these there will be a mortality of 5–10 per cent. in the first few days after being wounded. For these cases 15–20 beds at least (duplicated for the sexes) should be available, and a large nursing staff will be required.

A MANY-SIDED PROBLEM

The proportion of gassed to wounded will probably vary inversely, so that it will not be necessary to provide great accommodation for gas as well as high-explosive casualties, but to be ready to convert wards as required. If phosgene has to be dealt with, oxygen in large amounts will be needed and a large nursing staff must be in attendance. The auxiliary "Tor" operating table may be useful in posturing patients in whom the secretions of the lungs are so profuse that the patient is being drowned in his own expectoration. If large numbers of gas cases occur, it will be in the best interests of the patients to provide a special gas hospital, with a staff of physicians and trained nurses in attendance.

Work in hospital on civilian cases resulting from air-raids will be very different from military surgery. Not only have the two sexes to be catered for, including children, but patients' relations and anxious friends may come in large numbers. Adequate waiting-rooms with canteens must be provided. This accommodation may be found by taking over a neighbouring building, such as a church hall, which has been rendered splinter-proof.

A well-staffed dispensary will be necessary, and large supplies of oxygen, serum, anæsthetics, nitrous oxide, dressings, and perhaps bleach paste must be available. The disposal of clothing and valuables has already been mentioned. Kitchen arrangements for patients and personnel are important. The hospital laundry must be prepared to function with an extra staff, or outside contracts secured.

Besides the regular nursing staff, extra nurses will be required and a large auxiliary personnel provided by the Order of St. John and the British Red Cross Society. The latter will probably live in their own homes and work in 8- or 12-hour shifts. They will require rest-, changing-, and dining-rooms, and perhaps extra washing and lavatory accommodation.

Extra mortuary accommodation will be required, with an augmented staff of orderlies. The provision of funeral arrangements and extra cemetery accommodation is being dealt with by a special Government department.

Medical transport plays a very important part in the handling of mass casualties. The present supply of ambulance cars may not be sufficient, and auxiliary vehicles will be needed. Moreover, the existing ambulances are not as a rule fitted to take four stretcher cases or even adapted to take our standard stretcher (7 ft. 9 in. by 23 in.). This fault should be rectified as soon as possible.

CONTROL OF THE COMMON FEVERS

DIPHTHERIA

Reviewed by DR. E. H. R. HARRIES, *medical superintendent, North Eastern Hospital, L.C.C.*

IN an admirable paper Fitzgerald, Fraser, McKinnon, and Ross (1938) gave statistical chapter and verse to justify their conclusion that "the extent of the decline in several of the large cities and in certain of the provinces of Canada shows indubitably that diphtheria is a preventable disease." As yet, diphtheria is not prevented in this country. For all practical purposes the disease continues to pursue its way unrestrained by the time-honoured measures of "notification, removal, and disinfection," from which Sir Arthur MacNalty (1938) says it is doubtful whether any marked diminution is to be expected. Years of great prevalence still alternate with those during which the numbers of notifications and deaths are somewhat fewer, but at best the annual toll of morbidity and mortality, with all that is implied in suffering, grief, and expense to the community, must seem almost fantastic to observers in those parts of Canada and the United States of America which have adopted active immunisation. Thus, in England and Wales in 1937, 61,341 cases were notified: rather more than in 1936 (57,795); rather less than in 1935 (68,759) and 1934 (68,839). According to a provisional report of the health section of the League of Nations (1938), diphtheria is on the increase—not, of course, in this country alone. Up to Oct. 8, 1938, 54,490 cases were notified in England and Wales, as compared with 48,926 during the corresponding period of 1937.

In 1937, 2963 deaths from diphtheria occurred in England and Wales (in some years the figure ranges around 5000). Of every 1000 deaths from all causes 6 were due to diphtheria, and of these 5 were those of children under fifteen years of age (MacNalty 1938). The case-fatality rate based upon the notifications was 4·8 per cent. (5·3 per cent. in 1936; 5·4 per cent. in 1935). It has always been the practice in this country to remove to hospital a high proportion (90 per cent. or more in some cities) of patients notified as suffering from diphtheria, and in 1937 (London County Council 1938) the infectious diseases hospitals of the L.C.C. admitted 5679 cases of clinical diphtheria (figures corrected for diagnosis) besides 453 verified carriers. The case-fatality rate of clinical diphtheria in those hospitals was 3·37 per cent. at all ages, or 5 per cent. among those under 5 years of age. But, although patients admitted to these and other fever hospitals have the advantages of skilled treatment and, above all, of skilled nursing, which between them effect the saving of many lives, hospitalisation does not diminish incidence and therefore does not *control* diphtheria but only promotes the *salvage* of the diphtheria patient. In 1939 it is trite to remark that there is only one rational means of control, and that is by active immunisation of the child population, particularly those of pre-school age (fig. 1). Fitzgerald and his co-workers say that prior to the use of toxoid there was no effective control of the disease in Canada, and that, in spite of free distribution of antitoxin for prevention and treatment, morbidity persisted at its previous high levels, and mortality, although falling, presented one of the most important public health problems. That problem, in Canada, has ceased to be important. In Toronto (650,000 population) 104,000 children had been immunised since 1926 until the date of Fitzgerald's paper. In 1930 the morbidity-rate was 164 per 100,000; in 1934 only 3·5. From 1921 to 1925, pre-toxoid years, an average annual number of 65 deaths from diphtheria occurred in Toronto. From January, 1934, to March, 1935, and again in 1937 nobody died from diphtheria in that great city.

MacNalty (1938) reports that immunisation in this country makes continuous if slow progress, but no city, he says, has yet succeeded in immunising the 50–60 per cent. of the child population which is necessary before incidence is affected. In 1937 Chester headed the list with 45 per cent.; Birmingham is included in the 35–40 per cent. group. Acton led Greater London with 30 per cent. The London metropolitan boroughs vary greatly in their local circumstances and difficulties; some are going full speed, others half-speed, and others distinctly "slow." The average figure for them all in 1937 was 5·3 per cent. of the child population immunised (MacNalty 1938).

The dissatisfaction of medical officers of health with the present condition is reflected in a trenchant leading article in the *Medical Officer* (1938). "To the health officer," the writer says, "whose business it is to prevent disease, the three to five thousand deaths a year are a persistent reminder of a failure which rankles more than any other. For these deaths there is no valid excuse; they occur because we have not done what we know we should have done; . . . Our children die from diphtheria because we let them die; not because we cannot prevent them from dying. The blame may be upon public apathy, but it is our business to remove that apathy." It cannot be assumed, however, that the depressing rates for the community as a whole represent all the immunisation that is taking place. There must now be few residential schools (other than the public schools which, despite a

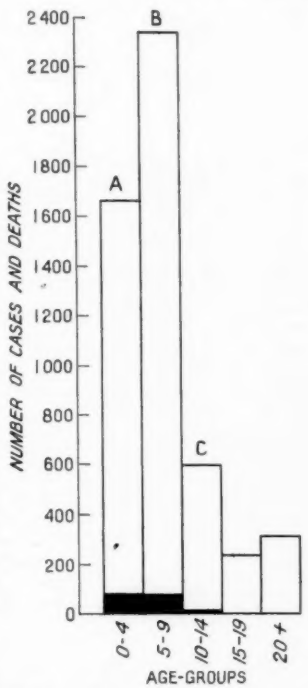


FIG. 1—Diagram showing importance of immunising children of pre-school age against diphtheria. Immunisation on an adequate scale before school entry would reduce not only column A but also columns B and C, whereas immunisation only on or after school entry cannot affect column A. Columns represent total cases of diphtheria, and black portions the number of deaths.

high Schick-positive rate, are strikingly free from diphtheria) where the children are not immunised. Certainly in the residential schools of the L.C.C. the children are so protected, with parental consent of course, and as a result cases of clinical diphtheria from these establishments have become very rare indeed. Needless to add, the nursing staffs of all large fever and many other hospitals have, for years, been offered and, with few exceptions, have accepted immunisation if they proved to be Schick-positive, with the result that,

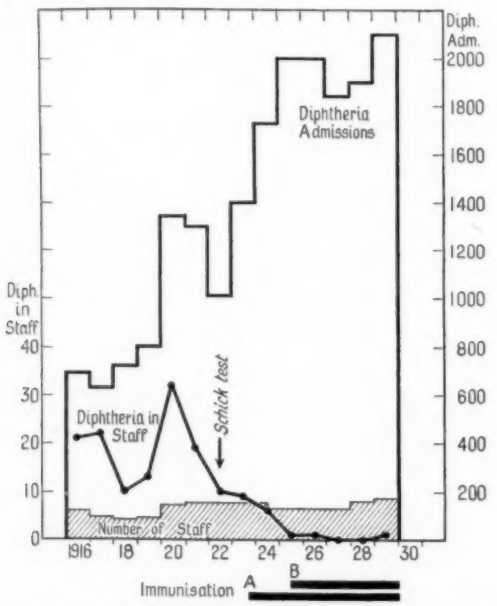


FIG. 2—Diagram showing effect of immunising the staff of the Birmingham City Hospital against diphtheria. Columns represent diphtheria admissions, and curve the cases among the staff. Inoculation of nurses began at A, and of domestic staff at B. Shaded area represents average strength of nursing and domestic staff each year. (See Harries, *Lancet*, 1930, **1**, 802.)

as O'Brien showed some years ago, the incidence of diphtheria among nurses in diphtheria wards, which was formerly about 10 per cent., is now a fraction of 1 per cent. (fig. 2). Medical students are similarly protected. It does not fall within my province to discuss the extraneous conditions which may make or mar the success of any immunisation scheme, but it may serve a useful purpose to consider, very briefly, current views upon, and practice in, technique.

THE SCHICK TEST

Those of us who in the early days of immunisation pinned our faith to the Schick test were perhaps too dogmatic as to its infallibility in all circumstances. But although the conclusion of Parish and Wright (1938) must be accepted that a negative reaction does not always indicate ability to withstand a virulent infection, especially of the "gravis" or "intermediate" types, there can be few biological tests that through the years have so proved their general reliability. The old antitoxin level, 1/30 unit per c.cm. of blood, which was believed to be consistent with a negative reaction, no longer holds. Parish and Wright found that the test might be negative, even if carried out with a fourfold reagent, with antitoxin titres varying from 0·01 to 0·002 unit per c.cm. of blood. Therefore to ensure a high level of immunity they advise periodical injections of the prophylactic even to negative reactors. Schwartz and Janney (1938) found 22 relapses among 122 pre-school negative reactors who were retested six to seven years later, and they consider that as a routine measure either a retest at school entry or a dose of prophylactic is desirable. Having regard to Parish and Wright's work the latter would appear to be preferable. But which prophylactic?

PROPHYLACTICS

Immunisation being such a tender plant in this country, one severe reaction may prejudice a clinic, and so the choice of prophylactic must be based not only upon its possession of antigenic potency but also upon its lack of anti-propaganda value. In all, the antigenic stimulus is provided by toxoid—i.e., diphtheria toxin modified by treatment with formaldehyde—but particular circumstances may decide whether formol-toxoid (F.T.), toxoid-antitoxin floccules (T.A.F.), alum-precipitated toxoid (A.P.T.), or toxoid-antitoxin mixture (T.A.M.) is used. The first three are potent; the last less potent and therefore slower, but since it gives rise to but few reactions at any age it has played an important part in immunisation in this country and is still preferred by some workers. F.T. is used in Canada and in London. Among children under eight years few reactions occur, and potential reactors are detected in Canada by a preliminary Moloney test (the intradermal injection of diluted toxoid)—not much used in England. Mitman (1936) has shown that comparable information is afforded by the pseudo+positive Schick reaction (when this has been performed). For older children and adults T.A.F. is largely used; very few reactions occur, and these are rarely severe. Present indications are that A.P.T. is the prophylactic of the future, especially for children. Chesney (1938) considers it superior to F.T. and T.A.F. "for consistent and rapid production of a high grade and durable immunity with a minimum of injections." He is not convinced of the reliability of the Moloney test, preferring to use a "detector" dose which also serves as a first immunising dose. The detector dose may be 0·2 c.cm. (0·1 c.cm. in children over ten) followed four weeks later by 0·4 c.cm. A.P.T. If the detector dose elicits sensitiveness to the prophylactic, the amount of the second dose is reduced in proportion to the degree of the local reaction. Parish (personal communication), however, prefers, if considerable sensitiveness has been elicited by a detector dose of A.P.T. in children or a pseudo+positive Schick test in adults, to use another prophylactic—e.g., T.A.F. Whatever the prophylactic and the dose, at least two injections must be made at intervals not shorter than two weeks; many prefer three weeks; Chesney and others four. The "one-shot" method is not sound practice; it may act virtually as Glenny's "primary stimulus" among communities with a high Schick-positive rate; the "secondary stimulus" provided by an additional dose should be regarded as essential to secure a high level of protection. Chesney found that of 1300 children injected by his method only 3 were Schick-positive two months later. That immunity was of a high level is shown by the fact that of 768 children tested with a fourfold Schick toxin 765 were negative. Although nearly 100 per cent. of successful results may be counted upon with A.P.T.,

no child should be certified immune until it is known that a Schick test is negative.

PASSIVE IMMUNISATION

It should not be forgotten that for the immediate but temporary protection of exposed children, especially familial contacts, passive immunisation has been available for more than forty years. From 1000 to 2000 units of antitoxin will protect over an average period of three weeks. With modern concentrated sera reactions following this dose need cause no anxiety. If possible it is better to carry out preliminary Schick tests and to inject only the positive reactors. A few weeks later active immunisation may be considered or, if the contacts are under daily observation, may be at once substituted for passive immunisation, since there is no evidence that this procedure causes a negative phase. Although sensitisation to serum results very rarely indeed from passive immunisation, any fear on this score may be dismissed by choosing F.T. or A.P.T. as the prophylactic, since neither contains horse serum.

THE SWAB

In diagnosis.—Diagnosis, which must precede "notification, removal, and disinfection," unfortunately waits too often upon a bacteriological report. Reliance upon the bacteriologist to perform a task he has never claimed to undertake—viz., the diagnosis of the disease diphtheria as distinct from the *C. diphtheriæ*—leads, on the one hand, to admission to hospital only when the disease is hopelessly advanced and, on the other, to the unnecessary occupation of beds by those who have been sent in merely upon the strength of a bacteriological report without clinical evidence of diphtheria. Further investigation often reveals that the organism is a harmless diphtheroid. In 1937 in the L.C.C. fever hospitals it was necessary to revise the diagnosis in 26·2 per cent. of the patients notified as suffering from diphtheria or carrying diphtheria bacilli, and in the same year in the Birmingham City Hospital 743 of 2049 cases (31·3 per cent.) were similarly revised, but of 70 fatal cases of diphtheria McGarrity (1938) reports that 19 died within forty-eight hours of admission. In the diagnosis of diphtheria swabbing should be merely a confirmatory procedure; nevertheless confirmation is much to be desired at the earliest moment, and to this end the prepared Solé swab retrieved by Parish (1935), and of which a modification is on the market, is said to enable a morphological diagnosis of the organisms to be made in about four hours if necessary. A method was recently described (*Lancet* 1938) which consisted in rubbing a swab dipped in a 2 per cent. solution of potassium tellurite upon the suspected exudate in situ; blackening occurs within five to ten minutes if the exudate contains diphtheria bacilli, but unfortunately an unpleasant odour of garlic is produced.

In the detection of carriers.—The true function of the swab being the collection for examination of the diphtheria bacillus if present upon the mucosa, it is for the detection of carriers that its use is essential. Most diphtheria patients rid themselves of organisms by or before the time they are clinically fit, and it is customary to secure two consecutive negative swabbings from both nose and throat as presumptive evidence of clearance. Some, however, continue to harbour organisms and become "convalescent" carriers, but it is not legitimate to declare anybody a carrier whether "healthy" (contact) or convalescent until it is known that the organisms are virulent. Before agreeing that a true carrier is cured of carrying it is usual to obtain a consecutive series of three or more negative swabbings from nose and throat. There is evidence that carriers aggregated in open wards for treatment may become reinfected, as shown by the change in the type of organism recovered—e.g., mitis to gravis—a process identical with the reinfection of convalescent scarlet-fever patients with different serological types of the hæmolytic streptococcus. Carriers clear more readily in the open air and in any case should be housed in airy wards with wide-spaced beds. They nearly all have some abnormality of the nasopharyngeal mucosa, and this should be diagnosed as soon as they come under treatment, because, although many clear spontaneously, or as the result of the use of alkaline douches or snuffs, some in the end require rational surgical measures. If clearance is not obtained in a reasonable time, it is desirable to segregate the child in a cubicle or chamber and, if this fails, to consider the surgical rectification of such abnormalities as have already been noted. The removal of tonsils may be relied upon to cure the throat carrier; the nasal carrier is a more difficult problem; the removal of adenoids may be the solution, but a carrier at present under my observation, who suffers from lupus of the nose, seems likely to become the oldest inhabitant. It may be added that the most dangerous source of infection is not the occult carrier but the child with the overt blood-stained yellowish nasal discharge characteristic of anterior nasal diphtheria.

Alleged effect of immunisation.—It has been objected that active immunisation increases the number of carriers, and Dudley (1934) has concluded that under certain conditions artificial immunisation may increase the risk of infection to the *unprotected*. He also foresaw that this statement might be twisted to serve anti-propaganda. Clearly, immunisation cannot prevent the carrier state, but it does ensure that the chronic carrier, himself immune, if he spreads infection only among immunes performs a useful service by maintaining the average level of immunity. In closed communities, such as residential schools, if all are immune, carriers are no menace; if all are not immune they may be. It seems obvious also that the introduction of a carrier to a closed community whose natural immunes have been increased artificially, even if all are not immune, is likely to lead to fewer clinical cases than would be the case, under identical conditions of exposure, in an institution where no artificial immunisation had been attempted. There is no evidence that the immunisation of nurses in fever hospitals has increased the carrier-rate among them (Harries, 1935).

In the open community Fitzgerald et al. (1938) found no evidence in support of the suggestion that immunes increase the hazard of diphtheria. Fraser and Halpern (1937) examined 7800 nose and throat cultures from school-children in Toronto between May, 1934, and June, 1936; only 4 cultures were found to contain virulent diphtheria bacilli.

No real progress in immunisation is possible in this country without the approval and coöperation of the general practitioner and the enlightenment of the general public. The most hopeful sign that a preventable disease will before long be prevented is the concern of the clinical and preventive branches of the profession for the unnecessary loss of children's lives. Although the labourer is worthy of his hire, occasions have arisen, as quite recently at Ripley, Derbyshire, when the local doctors have renounced any fees for immunising children so that, in the

presence of an epidemic, the work might not be held up on the score of cost to the rate-payers, who expressed warm appreciation of their action.

REFERENCES

Chesney, G. (1938) *Ulster med. J.* **7**, 45.
Dudley, S. F., et al. (1934) *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 195, p. 110.
Fitzgerald, J. G., Fraser, D. T., McKinnon, N. E., and Ross, M. A. (1938) *Lancet*, **1**, 391.
Fraser, D. T., and Halpern, K. C. (1937) *J. Immunol.* **33**, 323.
Harries, E. H. R. (1935) *Lancet*, **2**, 233.
Lancet (1938) Nov. 19th, p. 1181.
League of Nations (1938) see *Brit. med. J.* Dec. 10th, 1938, p. 1242.
London County Council (1938) report for 1937, **4**, part 1.
McGarrity, J. (1938) *Rep. med. Offr Hlth Bgham*, 1937.
MacNalty, A. S. (1938) State of the Public Health, 1937. *Med. Offr* (1938) **60**, 245.
Mitman, M. (1936) *J. Hyg., Camb.* **35**, 512.
Parish, H. J. (1935) *Lancet*, **1**, 400.
— and Wright, J. (1938) *Ibid.* **1**, 882.
Schwartz, A. B., and Janney, T. R. (1938) *J. Amer. med. Ass.* **110**, 1743.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A PHYSIOLOGIST IN AMERICA

I

July 25.—Yesterday was a lovely day, but rather chilly. We spent most of the time on deck watching the south coast of England unfold before us and drop behind. I woke up to see Dover at about 5 A.M., and later recognised Beachy Head and the Isle of Wight. Last night we could see the dim shape of Dartmoor, and at about midnight the Eddystone Light flashed us a long good-bye.

July 26.—People are beginning to pair off a little, and we are amused at one obviously "brilliant young doctor" who now has three girls in tow. They hang with open mouths and eyes a-goggle on his lightest word, and occasionally we catch "metabolism" and "acidosis" drifting by on the breeze. According to the ship's surgeon, he is going to America to make his fortune.

July 27.—The captain said that directly the wind got round to the N.W. the sea would be flattened out, but this-morning the wind is N.W. and the sea is terrific.

* * *

August 1.—To-day the great event has been our arrival. We are now riding at anchor in the Narrows, between Staten Island and the end of Long Island. At about 5.30 P.M. a lighthouse on Long Island was sighted on the horizon, and promptly disappeared again. Then everything began to happen. We were met by a ship which delivered a pilot in a small boat. Lots of other ships appeared from nowhere, and the sea became dotted with buoys: silent buoys, bell buoys, moaning buoys, and flashing buoys. More lighthouses on little islands loomed up. Coney Island (?) with a large hotel and a magnificent gasometer rose out of the sea to starboard, and a long cloud on the port bow materialised into the heights of New Jersey. We were soon in a channel with land on both sides, and could plainly see the cars on Long Island. Manhattan itself, straight ahead, remained bashful and refused to emerge from the haze. We could dimly make out a few perpendicular shadows, and then the sun went down like a red ball behind the trees of Staten Island and we were at anchor. When the lights came on the mist must have lifted, for we could see the floodlit Statue of Liberty, and lights on the top of a couple of high buildings. The river swarms with all kinds of boats. The ferries going over to Brooklyn look like little floating islands, and brightly lit boats with an incredible number of decks, rather like mint humbugs, keep up a constant procession, probably to Coney Island.

August 2.—Up at 5 A.M. . . . the *Normandie* at anchor with her floodlit red funnels . . . the Statue of Liberty . . . the New York sky-line (sheer, sheer majesty!) . . . the immigration officials (deep anti-climax). So they don't want us in America. What, they wish to know, is Marjorie, aged 5, doing here? I distinctly remember writing on a form that she was not an anarchist. Do they suspect the truth? Have we any money? (I could have sworn that I had suppressed the fact of my being a physiologist, but murder will out.) On seeing the large blue paper I got from the Consulate, bearing photograph, birth certificate, and endless other details, they seem to think better of us and we are allowed to go. . . . The Customs, easy but endless. Two dollars fifty to pay. What for? Heaven alone knows: anything to get away from this place. . . . Why didn't someone tell us what "Express" means on this side of the world? (To the uninitiated—it means the painless disposal of baggage.) We took our trunks with us. There was no provision for them on the stream-lined taxi until the driver, assisted by several interested passers-by, put down a luggage grid. Our first real misgivings about "American efficiency." Fare to the Grand Central Terminal, 85c—plus a trifle of 50c for each trunk. Misgivings about the taxi-driver.

Outside the luggage room, by a ridiculously short low metal counter, we had to leave our pile of eleven pieces in everybody's way while I went to get the railway tickets. The Grand Central Terminal has an enormous central hall with a gallery round the top, on which we had been deposited. It took a long time to get the route from the inquiry office, and then the tickets had to be laboriously written out for each of us—train to Providence—'bus to New Bedford—steamer to Woods Hole. Had to wait another hour at the baggage room counter in sweltering heat before the man behind the counter condescended to notice our collection. I don't blame him. He had to weigh everything and write out duplicate labels for each piece. By the time he had finished it was our train time, and as far as the eye could see were throngs of passengers from the *Normandie* with loads and loads of luggage. Can this be the land of the slick?

Out of the marble hall through a door into a gloomy cavern . . . trains dimly discernible . . . long coaches, beautifully clean with immaculate decorations . . . seats on each side of a central aisle, all facing forwards. No smoking. Four hours of purgatory, not on account of the "no smoking," which was rather pleasant, but because the air-conditioning plant had broken down. Heat appalling. Luncheon car perpetually full. Is there any such thing as efficiency in this blistering country? Ah. yes. A boy with coffee and aseptic sandwiches. And Marjorie has discovered a tap of ice-cold water, an ingenious device delivering sterile paper cups and a fascinating trap-door for disposing of them after use. . . . Attendants with magazines, with ice-cream, and with chocolates.

Strangest of all, a youth soliciting telegrams. . . . Thank God for Providence.

We were able to breathe again during our break-neck ride to New Bedford. The country is wooded, uncultivated and, near the road, prettily untidy. Houses are built on little clearings, have no hedges or fences, and their lawns stop abruptly and give way to scrub. Almost without exception the houses are of wood, so that their walls look like enormous venetian blinds, with picturesque steep roofs and overhanging eaves. Most of them have a loggia round two sides. When not properly painted or stained they tend to look a bit dilapidated.

* * *

Woods Hole, Mass.
Sept. 1.

DEAR JOHN,—You would enjoy this place. Can you imagine a massive L-shaped brick building, three stories high, set in the middle of a little seaside village? No, it is not the local hotel, though if you could imagine an hotel in which all the bedrooms were laboratories you would not be far from the mark. People from all over the country bring their work here for the summer, renting a lab and enjoying the library, which is amazingly good. I have forgotten how many hundred periodicals they take, but there is everything here one is likely to need except a few surgical journals. Once a week there are "seminars in the big lecture theatre—quite the biggest I have been in—when "investigators" report on their work. (We are classified as Investigators or Students.) There are also frequent lectures by visitors and those of us who are sufficiently distinguished. No, I didn't give one, I use "us" in the democratic sense. We are a true democracy, and I am secretly proud of the fact that I like it; it shows I have Decent Instincts. There is a sort of skeleton permanent staff, but everything is worked with the aid of students—the supply rooms, the cleaning, the waiting at table, &c. And they enjoy it thoroughly and have heaps of enthusiasm left over for their classes. A number of vacation courses are run here, such as embryology, invertebrate zoology, physiology, and so on. I should like to take the physiology course myself; micro-dissection is only one of the things they do. There are over 300 of us all told, all thoroughly mixed three times a day at the Mess, and undergoing diffusion at tea-parties, beach parties, tennis, concerts, and meetings. And Boy! do we enjoy whatever we happen to be doing at the moment? I'll say we do. When we work we work, and when we play we play. Yes *Sir!*

But you don't want to hear about work; one laboratory is much the same as another. Though I must say it is novel to me to have salt water laid on and a tank in which I can keep a shark if I want to. Most of the people here affect the more highbrow types of biology, but there is quite a sprinkling of physiologists and biochemists and it is not forbidden to work on the mammalia. The supply department will produce practically anything. A girl we knew ordered some snakes, and a few were duly rounded up. She used to keep them on ice in a state of perpetual coma and remove bits of muscle when necessary. Only on her last day did she discover that she had been harbouring the only poisonous variety on Cape Cod. An attractive idea, don't you think? Anæsthesia by just popping the patient into a refrigerator; and a pint of ice-cream as a sedative instead of a dose of bromide. Sorry, I seem to be talking shop again.

Our uniform is simple. The maximum is a shirt, a pair of trousers and sneakers (that's got you guessing). You'd be surprised how it shortens the time of getting up in the morning, and how pleasant it is to loaf into the lab at about 8.30 A.M. I took the opportunity of wearing out a pair of white flannels, and didn't realise until I had almost succeeded that I had been wearing what was to all intents and purposes evening dress. When invited to a party it is sufficient to add shoes, socks, and tie, and wear a respectable pair of trousers. Flannel is highly respectable, and almost too good to wear in a holiday place like Woods Hole, the reason being that it is very difficult to get in this country. A pair of "flannel bags" I am told costs about £3–4.

In the afternoon we go to the beach *en famille* and steep ourselves in sun and water. I got left behind the other day, and in my haste to catch up with the others I leapt out of the door of the apartment house clad only in a pair of bathing trunks almost into the arms of a distinguished German professor I had once met in London. "Oh, hello!" I said, gave one look at his face, and fled. I am weak enough to hope he didn't recognise me. The water here is warm—really warm—owing to the Gulf Stream, which, incidentally, seems responsible for everything in this part of the world. The Captain never ceased referring to it on the way across. They say, however, that on the north shore of the Cape the water is ice-cold on account of the Labrador Current. It is probably the Gulf Stream in disguise.

Cape Cod is an interesting place, and would be even more so if we knew a little more about its history. Did you know that the Pilgrim Fathers landed here first? We were taken to see the spot the other day—Provincetown, right on the northernmost tip of the Cape. At least, it would have been on the tip if the last spit of land had not curled affectionately round it in the shape of a hook and made it into a harbour. But for the smell of dead fish the Pilgrims might have stayed there. As it was, they pushed off again and settled at Plymouth, on the mainland. There is a rather fine granite monument—the Pilgrim's Memorial—at Provincetown. It is "252 feet, seven and one half inches in total height" and is a copy of the Torre del Mangia in Siena. We walked up to the top by means of a gentle slope which circulates round the interior and which is much more pleasant than climbing steps. Needless to say, "the view from the top . . . is superb. The entire Cape is spread out below the observer like a map, and the view extends many miles out at sea. One of the conditions upon which the government appropriation was granted was that the Monument should be given over to the government, in case of war, as an observation station." They take war quite seriously over here, and were having aerial manœuvres, complete with "black-outs" long before all the recent crises.

Cape Cod seems to be more or less of a holiday resort, nearly every inch of coast being occupied by country clubs or film stars. The towns are charming, with a strange mixture of English and Indian names—Falmouth, Hyannis, Yarmouth, Harwich, Chatham, Barnstable, Pocasset, Sandwich, &c. At Chatham a long sand-spit runs south into Nantucket Sound and is said to have diverted the P. Fathers from their original intention of landing in New Jersey.

Nantucket is an island which we set out to explore, but we failed to get beyond the quaint town of Nantucket itself. How refreshing it was to see a wide cobbled main-street-cum-market-place again! And trim little gardens with hedges round them. But the chief interest of the place lies in its whaling history. Apparently they produced a happy breed of captains in days gone by, for there is quite a gallery

of their portraits in the museum, and the town is full of houses with "widows' walks" on top of them. These railed-in platforms seem to have been the prerogative of captains' wives. I wish I had time to tell you about the whaling museum—shades of Moby Dick! There were life-size exhibits of a fully equipped whaleboat (the small boat in which they used to put off and chase the brute), and the brick fireplace which used to be built on the deck of the ship to melt the blubber. Part of the building itself was an enormous old press for squeezing oil out of spermaceti. It was of the beam variety, and said to be the only one of its kind. It was actuated by a box of heavy stones—and this was in use in a flourishing industry less than 100 years ago! I may say it looked extraordinarily effective, and the tree from which it had been cut must have been a monster. Whaling was by no means a local pursuit; the whalers seem to have ranged the seven seas. We saw Eskimo, Maori, and Polynesian trophies, and interesting relics of Captain Cook and Robert Louis Stevenson. In one of the streets was a willow tree taken from the grave of Napoleon at St. Helena—involuntary humoral transmission?

Some of the old log-books were written in beautiful handwriting and many of them were illustrated with excellent drawings of whales as seen from the ship. Often they had a distinct literary quality, and some of these old whaling captains must have been cultured as well as wealthy. One log-book recorded the first finding in 1808, of the colony on Pitcairn Island founded by mutineers of the *Bounty*. The sea was so important to Nantucket that they have the town meridian line marked out in the street. If ever the island gets blown away, it will be possible to put it back in exactly the same place. Cheap humour, say you; you're right, say I. People who lay down meridian lines are all too few, and the hours I've spent on this letter all too many—unprecedented in fact.

As ever,

B.

PUBLIC HEALTH

The Registrar-General's Reports

WHEN students of population trends estimate that the inhabitants of England and Wales in the year 2039 will number, say, a miserable 5 millions, their calculation is apt to have the opposite effect to that intended. It does not make our flesh creep or move us to instant action on what is actually one of the most important questions of the day. It is all too remote, and though the sums are right they naturally depend on assumptions about the future behaviour of the birth, death, and migration rates. The hard facts of the present and the prospects of the near future are infinitely more impressive, as a few broad figures may show:—

Age-group: A = 0–14; B = 15–34; C = 35–64; D = 65 and over; E = All ages.

Age-group	Population of England and Wales				
	1921	1931	R.-G.'s estimates for 1937	1931–21	1937–31
A	10,500,455	9,520,198	8,930,600	− 980,257	− 589,598
B	12,415,725	13,341,374	13,417,600	+ 925,649	+ 76,226
C	12,679,414	14,127,596	15,208,300	+1,448,182	+1,080,704
D	2,291,105	2,963,209	3,474,500	+ 672,104	+ 511,291
E	37,886,699	39,952,377	41,031,000	+2,065,678	+1,078,623

According to the estimate for 1937 lately published by the Registrar-General,[1] the total population of England and Wales was a little over 41 million, or rather more than a million above the figure revealed by the census of 1931. But this total change conceals the profound changes at different ages. Of children (ages 0–14) there were nearly a million less at the census of 1931 than at the census of 1921; between 1931 and 1937 there has been a further fall of nearly 600,000. Clearly no change of heart can alter the fact that there will be fewer to replace the present generation, fewer to produce the subsequent generation, and fewer to produce the goods and comforts required by the rising numbers in the old-age group, shown in the last line of the table. Even at ages 15–34 there was a negligible increase in numbers between 1931 and 1937 and this too must shortly become a decrease (in the absence of immigration). A stationary and stable population may be a desirable end, but we are likely to traverse a hard path in reaching it.

For those who prefer to eat, drink, and be merry the Registrar-General provides a wealth of detail as to how we died on the yesterday, if not on the morrow. His report for 1937 shows that year to have been in no way remarkable in its vital statistics. Owing to the influenza epidemic of the first quarter of the year—to which nearly 16,000 deaths were attributed—its crude death-rate of 12·4 per 1000 persons was the highest since 1929. In the first year of life 35,175 infants died, and the consequent rate of 58 deaths per 1000 live births differs little from the rates of the previous three years. At school ages (5–10) the death-rate of 1·9 per 1000 was the lowest yet recorded, the incidence of measles, scarlet fever, and whooping-cough being very low. At all ages a relatively high incidence of dysentery is noticeable, over 4000 cases being notified or 3–4 times as many as in 1935 and 1936. It is also worthy of note that 1937 was the third year in succession in which no death from small-pox was registered.

The Registrar-General's analysis of the half-million deaths tabulated in this volume necessarily follows at a later date, in his text volume. At the moment he has just issued the corresponding analysis of the records of 1936.[2] Besides the many routine tables of death-rates by different causes and at different ages this volume contains a large number of special studies relating to such features as mortality in the great towns grouped according to their size, the problem of deaths classed in 1931–35 to congenital malformations, deaths from rheumatic fever and associated heart disease, and the seasonal distribution of mortality in the quinquennium 1931–35.

Comparing the mortality-rates in different administrative areas in 1911–14 with those recorded in recent years it is found that owing to the more rapid reduction in urban than rural mortality the handicap imposed by urban residence is now little more than half as great as it was a quarter of a century ago. On the other hand the Registrar-General can find no support for the hypothesis that from the standpoint of

[1] The Registrar-General's Statistical Review of England and Wales for the year 1937 (New Annual Series, No. 17). Tables. Part I. Medical. H.M. Stationery Office. 1938. Pp. 406. 6s.

[2] The Registrar-General's Statistical Review of England and Wales for the year 1936 (New Annual Series, No. 16). Text. H.M. Stationery Office. 1938. Pp. 204. 3s.

resulting healthiness there is some optimal population for towns which is intermediate between the smallest and the largest; as judged by the standardised death-rates, the healthiness of towns outside Greater London tends to improve progressively with diminishing size.

The special study of rheumatic fever shows that its mortality amongst children of school age has declined since 1925–27 by 25 per cent. for boys and 18 per cent. for girls, and for young adults by about a quarter. Analysis of the deaths attributed to diseases of the liver and gall-bladder shows that the number debited to "acute yellow atrophy" changed little between 1921 and 1933 but has increased each year since. The general trend of mortality from liver affections of obscure origin needs to be watched, the Registrar-General concludes, in view of the large number of new chemical and other substances which are being employed in therapeutics, some of which may have unsuspected toxic actions upon the liver.

As usual, his reports need careful study by those who would venture into the field of vital statistics; and many more venture there than would freely admit it or even realise it.

Poliomyelitis at a Public School

On Dec. 16 a case of poliomyelitis was diagnosed at Wellington College and confirmed after consultation; on the following day a second case was isolated. As term was to end on Dec. 19, the school authorities decided, after consultation with the local M.O.H., to inform parents by telegram of the situation, telling them that all boys would be detained at school till the 20th unless previously sent for or fetched. A circular letter followed entering more fully into details and giving advice as to quarantine. The postponement of school closing by one day was dictated by the difficulty of communications over the Sunday and the desire to allow parents time to arrange for quarantine. Parents of known immediate contacts were given the option of leaving their sons in quarantine at the school. Actually nearly all of the 650 boys were personally fetched on the 17th, 18th, and 19th; six contacts being left behind on Dec. 21. Two doubtful cases under observation proved to be definite cases on Dec. 20, and one boy subsequently developed the disease among the contacts on the 22nd. The cases at the college are generally of a reasonably mild type, the degree of paresis being not very high. The outbreak will no doubt in due course come under review by the Ministry of Health.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 24, 1938

Notifications.—The following cases * of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1402; diphtheria, 1124; enteric fever, 31 (22 "expected"); pneumonia (primary or influenzal), 825; puerperal pyrexia, 120; cerebro-spinal fever, 14; acute poliomyelitis, 29; acute polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 27; ophthalmia neonatorum, 72. No case of cholera, plague, or typhus fever was notified during the week.

The combined notifications of acute poliomyelitis and acute polio-encephalitis total as follows for the current week and the previous 22 weeks (working backwards): 31, 32, 30, 37, 42, 47, 53, 73, 74, 88, 85, 68, 56, 63, 83, 76, 82, 76, 83, 87, 63, 41, 29.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 30 was 3308, which included: Scarlet fever, 712; diphtheria, 1116 (carriers, 42); measles, 11; whooping-cough, 567; puerperal fever, 10 mothers (plus 5 babies); encephalitis lethargica, 296; poliomyelitis, 11. At St. Margaret's Hospital there were 24 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 2 (0) from measles, 3 (0) from scarlet fever, 12 (4) from whooping-cough, 31 (3) from diphtheria, 47 (15) from diarrhœa and enteritis under two years, and 41 (1) from influenza. The figures in parentheses are those for London itself.

East Ham reported the only death from typhoid. Fatal cases of diphtheria were scattered over 21 great towns, 3 each at Bootle, Liverpool, and Birmingham. Ten deaths at Liverpool were ascribed to influenza.

The number of stillbirths notified during the week was 289 (corresponding to a rate of 56 per 1000 total births), including 39 in London.

PANEL AND CONTRACT PRACTICE

Voluntary Health Insurance in Germany

THE desire for social security, which is an important element in contemporary western civilisation, is finding expression in various extensions of social insurance. The number of countries in which compulsory health insurance has been introduced is increasing, and in the countries where it is well established the tendency is to enlarge its field of operation, a recent example being the inclusion in the British scheme of workers between the ages of 14 and 16 years. It is interesting to note also that voluntary as well as compulsory social insurance is extending its scope. The voluntary pensions insurance scheme, which came into operation in this country last year, is an important new development, hospital contributory schemes are becoming more and more popular, and public medical services are steadily gaining ground.

Our Munich contemporary gives[1] a useful précis of the stages by which social insurance has reached its present status Even in Germany, the home of compulsory social insurance, where the persons insured under the compulsory health insurance scheme make up with their dependants about two-thirds of the total population, voluntary health insurance is an important factor in the life of the community. This is shown in a recent report summarised in the *National Insurance Gazette* of Dec. 29. At the end of 1937 there were 720 voluntary health insurance institutions in Germany with 9·37 million members, who were for the most part persons working on their own account, or officials or salaried employees not coming within the scope of the compulsory insurance scheme. Some were insured for cash benefits only, and a small number for special benefits such as hospital treatment, but 91 per cent. were members of institutions providing benefits similar to those provided by the state scheme. The bodies undertaking voluntary health insurance are of three kinds: mutual societies, incorporated institutions, and insurance companies, and the members of each kind of body form respectively 65 per cent., 21 per cent., and 14 per cent. of the total membership. The total premium income in 1937 amounted to 372,670,000 marks, or 39·75 marks per member, the corresponding amount in the state scheme being 64·47 marks. The average premium charged by the bodies providing full health insurance benefits was 41·45 marks per member, as against 22·98 marks charged for cash benefits only and 13·38 marks for

[1] Haedenkamf, K., *Münch. med. Wschr.* Dec. 30, 1938, p. 2028.

* The all-round diminution in this week's figures should be attributed to delay in posting returns rather than to a sudden diminution of infectious disorders.

special benefits. The total value of the benefits paid in 1937 was equivalent to 76·7 per cent. of the premium income, the corresponding figure in the state scheme being 87·6 per cent.

The following table shows that there are wide differences between the voluntary institutions and the compulsory funds in regard to the distribution of expenditure on the different benefits provided.

Benefits	Percentage expenditure	
	Voluntary institutions (1937)	Compulsory funds (1935)
Medical and dental treatment ..	53·7	33·5
Medicines	11·6	13·3
Hospital treatment	15·1	18·9
Maternity	2·5	9·0
Sickness benefit	4·9	23·0
Death benefit	3·8	1·0
Other benefits	8·4	0·5

Since the great majority of the voluntary insurers are independent workers or salaried employees whose incomes ordinarily do not cease when they are attacked by disabling sickness, it is not surprising that they make less provision for sickness benefit than is made in the compulsory insurance scheme, which applies chiefly to wage-earners.

Advice on Specialist Treatment

An insurance committee has had to deal with a curious case where an insurance practitioner made a charge for surgical treatment. The patient was suffering from a carbuncle, which the doctor excised, making a charge of two guineas and submitting form G.P.45 to the committee the same day. The patient applied to the committee for assistance towards the payment of the account, the grounds of complaint being that the practitioner gave the patient no advice as to other ways in which he might have obtained treatment. The terms of service provide that if a patient requires treatment which is not within the scope of the practitioner's obligations the practitioner shall advise him as to the steps which he should take to obtain that treatment.

At the hearing the complainant's wife said that both she and the complainant were dissatisfied at his progress, and they asked the practitioner's assistant if it was advisable for the patient to go into the local Royal Infirmary. According to the wife, the assistant said that the voluntary hospital would not admit the complainant, and advised continuance of fomentations. On the following morning the practitioner visited the patient and made arrangements for the operation to be performed that afternoon, but no alternative course was mentioned. The assistant denied that he had said the patient would not be admitted to hospital, but agreed that he might have said it was not a suitable case for a hospital. The practitioner himself said that he had told the patient that he could be done either at hospital or at home, but that it was not a suitable case for a voluntary hospital, and if it were necessary for him to be admitted it would have to be to the municipal hospital. The alternative was that he himself should operate, and he had explained that the operation would probably be held to be outside the terms of service, and a fee would be payable. It was then agreed that he should perform the operation.

Although there was conflicting evidence as to what was said at the interviews with the assistant and with the principal practitioner, the committee found that at one or other or both of those interviews hospital treatment was mentioned, but the case was not one which would have been readily admitted to a hospital. They decided that the respondent acted in the best interests of his patient, and that there was no breach of the terms of service.

A similar point arose in another case. A man consulted his insurance practitioner about an inflamed eye. The man said that he had felt a piece of grit hit the eye a day or so previously but the doctor could find only congestion, which he thought might be due to a "cold" in the eye, and could not detect any foreign body. As a precaution he gave the man an introduction to a centre of the Ophthalmic Treatment Board, by whom the insured person was sent to another doctor. According to the patient this practitioner spent about half an hour on the case, applying cocaine twice and eventually finding the grit embedded in the eye. An account was rendered to the man, who applied to his society for a grant to meet the bill. The society referred him to the insurance committee, and when writing to the committee the man complained that his doctor had not given him the option of going to a hospital, where as a contributor to the Hospital Saturday Fund he could have obtained treatment without charge.

The advice given by the insurance practitioner was of course quite proper, and there is no suggestion that he failed to comply with the terms of service, but unless the society can and will admit the case for a grant under the additional benefits scheme the man himself will have to pay the bill, and doubtless will feel aggrieved at having to pay for something which he appears to have had the forethought to cover by his contributions to the H.S.F. If there is a hospital within easy reach it seems that it would be better, in a case like this, to give the patient the option of going either to the hospital or to one of the eye centres. It should be remembered that not all societies make grants for optical benefit.

THE LANCET 100 YEARS AGO

January 5, 1839, p. 564.

From a report of the Medical and Surgical Society of Newcastle-on-Tyne on the state of the medical profession.

This Society, on surveying the condition of the medical profession, cannot but be strongly impressed with the varied and incongruous materials of which it is composed; they find its members, notwithstanding the perfect identity of their avocations, consisting of practitioners authorised by many different colleges and corporate institutions, from whom have been required unequal courses of study, and dissimilar examinations into the extent of their professional and scientific attainments. . . .

There are in the United Kingdom of Great Britain and Ireland, not fewer than 19 corporations having power to grant degrees in medicine and surgery, and differing essentially in the extent and duration of the curricula they enjoin. The Society is of opinion that all of these might be advantageously superseded by one institution being placed at the head of the profession in each division of the empire . . . that such institutions should have entire control over education, and the granting of degrees and licenses to practise, together with all other matters relating to the medical profession; that the course of instruction and test of qualification should be the same in each; that, from one or other of them, all persons engaged in the practice of medicine and surgery should be required to possess a diploma or license; that, to individuals thus authorised, the law should extend a suitable protection; and that proper measures should be enforced for the suppression of unqualified practitioners.

SPECIAL ARTICLES

MEDICINE AND THE LAW

The State as Heir

LAST month the *Times* published an interesting article by its Stockholm correspondent on the Inheritance Law adopted by Sweden in 1928. If a Swede dies intestate, cousins and more remote relatives are excluded from inheriting his property. The money falls in to the state and is earmarked for appropriation to various objects on the borderline between social welfare and public health. In ten years, it seems, Sweden has thus inherited a total of nearly £300,000. The money has been devoted to establishing or aiding "summer colonies" for poor children, particularly those who are weak and undernourished in towns and industrial centres and those who, though free from disease, come from tuberculosis-stricken families. Kindergartens, maternity and child welfare clinics, technical schools, and boy scout clubs are other causes which have benefited from the General Inheritance Fund. The law requires that the money shall be used for the care and education of children and young persons. In this fashion, the *Times* correspondent explains, the social function of inheritance is fulfilled though the fulfilment is transferred from the individual to the social plane. The fund does not finance any purpose for which public money must anyhow be granted. The state can renounce its right to inherit in favour of a relative or other person connected with the deceased in cases of hardship.

If Britain has not adopted a similar plan, the British Treasury takes what it can for the Exchequer. One must move with caution amid the mysteries of the English law of property, but it is broadly true that, if anyone dies intestate without near relatives, his possessions will fall to the Crown as *bona vacantia* in lieu of the now abolished process of escheat. Relationship for the purposes of intestacy now ceases with the descendants of uncles and aunts; more remote relations are disestablished and disendowed. If the deceased has made a will, legacy duty varies in steepness according to the degree of relationship. But what the Exchequer takes in this fashion in England is applied to the general relief of the taxpayer and is not earmarked to any specific object. In the history of local taxation grants there was once a somewhat incongruous association between "whisky money" and local education. The halfpenny per ton which coal-owners pay into the Mining Welfare Fund is applied by statute to benefit conditions in mining districts and to finance research. The totalisator fund established in 1928 under the Racecourse Betting Act can be made available for charities and for improving the breeding of horses. A prescribed percentage of the profits of Sunday cinemas is transmitted to a fund for encouraging the cinematograph "as a means of entertainment and instruction." Otherwise the state, reaping where it has not sown, pools the takings in a common reservoir to pay for the country's needs as a whole. The entertainment tax is not planned to support a national theatre or to subsidise an opera-house. Court fees do not go directly to finance the pauper litigant. If there is an attractive surplus in the Road Fund, if the Post Office or the proceeds of wireless licences show a handsome profit, the Chancellor of the Exchequer raids this like any other hen-roost to provide general relief for the taxpayer. A recent government bill proposes to divert into the Treasury the not inconsiderable sums made by the Public Trustee in the investment of certain trust moneys. Nothing is said about applying this fortuitous harvest to maintain the voluntary hospitals, to help the boy scouts, or to provide playing-fields. State lotteries in the past have done much for public objects like the British Museum. Whatever other countries may do, the voluntary hospitals in England must mainly rely on private generosity. The Inheritance (Family Provisions) Act of last July daringly violated the sanctity of testamentary disposition. Whether we are ready to go further and to substitute the state as heir after the Swedish pattern remains to be seen. A total of £300,000 in a ten-year period may not be thought to justify revolutionary proposals. Even the threat may be useful, however, if it reminds people of the duty to make a will.

A Missing Link in Medical Evidence

There was a curious case at assizes last month where a pathologist's evidence, through no fault of his own, failed in its significance. The charge was one of manslaughter. A car had mounted the pavement in a Cardiff street, had knocked down a septuagenarian pedestrian named Evans, had struck a wall, rebounded and proceeded some distance further before being brought to a stop. The driver, according to the police, made a statement admitting that he was drunk, that he was unable to drive, and that he had taken the car without the owner's permission. Evans died soon afterwards. A pathologist explained to the jury the results of the post-mortem examination. Evans had not been a healthy subject; he suffered from disease of the kidneys; the effect of the injury inflicted by the impact of the car was to accelerate death. Counsel for the prosecution must have felt that a conviction was now inevitable. When, however, the case for the prosecution had been completed, counsel for the accused made a submission. The prosecution, he said, had omitted to prove that the body which was the subject of the pathologist's evidence was the body which was injured by the car. The judge felt obliged to direct the jury to return a formal verdict of acquittal—a result which he described as an unsatisfactory ending.

Is the Patient to be Told?

If divorce is sought on the ground of incurable insanity, ought the patient to be informed of the petition? The point cropped up in Randall *v.* Randall, a case decided in the first week of December. The patient had been detained under a lunacy order since May, 1932. His defect of mind was a mere absence of will power. The president of the court, Sir Boyd Merriman, held that the unsoundness of mind was incurable; it was a mild case; but, once incurable unsoundness of mind was established, the question of degree was immaterial. The court required independent medical evidence since it was a borderline case and an order for release might perhaps have been made during the statutory period of five years. On the presentation of the petition the receiver of the patient's estate was appointed guardian *ad litem*. The keeper of the licensed house wherein the patient was detained was a layman; he seems to have decided, after a casual question to a local general practitioner, that the patient should not be told of the petition. The President, in granting a decree *nisi*, said that the decision not to inform

the patient was "manifestly wrong." The patient was quite capable of understanding what was going on. If he was not to be informed, it meant that he was unable to give any instructions to his guardian *ad litem*. The President pointed out that the duties of a guardian *ad litem* were not a mere formality. The guardian had to consider the patient's interests at every step of the proceedings and to make his own personal decision. Apparently the responsibility for deciding whether the patient shall be told or not rests with the guardian *ad litem*.

NEW YEAR HONOURS

THE honours list issued last Monday contains the following names of members of the medical profession :—

Baronet

John Donald Pollock, O.B.E., M.D.
Benefactor of the University of Edinburgh.

Knights Bachelor

Adolphe Abrahams, O.B.E., F.R.C.P.
Dean of the medical school, Westminster Hospital, London.

William Wilson Jameson, F.R.C.P.
Professor of public health in the University of London at the London School of Hygiene and Tropical Medicine.

Colonel Krishnaji Vishnoo Kukday, C.I.E., L.R.C.P.E., I.M.S. (retd.).

John Ramsay, C.B.E., F.R.A.C.S.
Consulting surgeon, Launceston Public Hospital.

Colonel Alexander James Hutchison Russell, C.B.E. M.D., K.H.S., I.M.S.
Public health commissioner with the Government of India.

C.B. (Military)

Surgeon Rear-Admiral Francis J. Gowans, M.B., K.H.S.

Major-General Frederick Duke Gwynne Howell, D.S.O., M.C., M.R.C.S., K.H.S.
Deputy director of medical services, Aldershot Command.

C.M.G.

Erroll Aubrey Neff, M.D.
Director of medical services, Cyprus.

Frank Victor Gordon Scholes, M.D., D.P.H.
Medical superintendent of the Infectious Diseases Hospital, Fairfield, state of Victoria.

C.I.E.

Lieut.-Colonel Gordon Covell, M.D., I.M.S.
Director, malaria survey of India.

Lieut.-Colonel J. B. Hance, O.B.E., F.R.C.S.E., I.M.S.
Residency surgeon in Mysore.

Lieut.-Colonel E. W. O'G. Kirwan, F.R.C.S.I., I.M.S.
Professor of ophthalmic surgery, medical college, Calcutta.

Major-General N. M. Wilson, O.B.E., M.R.C.S., I.M.S.
Surgeon-general with the Government of Madras.

C.V.O.

Charles Paul Wilson, F.R.C.S.
Surgeon to the ear, nose, and throat department, Middlesex Hospital.

C.B.E. (Military)

Colonel W. A. Robertson, M.C., M.D.
Assistant director of medical services, 51st (Highland) division, T.A.

Colonel G. L. Thornton, M.C., T.D., M.R.C.P.
Hon. colonel, medical units, 43rd (Wessex) division, T.A.

C.B.E. (Civil)

Arthur Stanley Griffith, M.D., D.P.H.
Bacteriologist, Medical Research Council.

Charlotte Leighton Houlton, M.D., F.R.C.O.G.
Chief medical officer, Women's Medical Service, India.

James Livingstone Thompson, M.B.
Surgeon, Castlemaine Hospital, state of Victoria.

M.V.O. (Fourth Class)

Bertram Cohen, M.B.
Hon. physician, Victoria Cottage Hospital, Sidmouth.

O.B.E. (Civil)

Major D. P. Bhargava, M.B., F.R.C.S., I.M.S.
Professor of surgery, Prince of Wales's Medical College, Patna, Bihar.

Eric Donaldson, M.D., D.P.H.
Medical officer, Ministry of Health.

Ethel Adelaide Douglas, M.B.
Medical officer, Kinnaird Hospital, Lucknow.

William Mowll Frazer, M.D., D.P.H.
Medical officer of health, Liverpool.

Lieut.-Colonel K. R. Krishnaswami Ayyangar, M.D., D.P.H., I.M.S. (retd.).
Lately director, Pasteur Institute of Southern India, Coonoor.

John Sutton Webster, M.B.
Radiologist, medical department, Straits Settlements.

Alexander Wilson, M.D.
Physician, Scio House Hospital.

Alice Woodward-Horsley, M.B.
Medical practitioner, Auckland.

M.B.E. (Civil)

Avice Mary Cam.
Medical missionary, Maubin district, Burma.

Dines Chandra Chakravarti, L.M.S., F.R.C.S.E.
Professor of clinical and operative surgery, medical college, Calcutta, Bengal.

Robert Thomas Mansfield Hayter, I.M.D.
Assistant director, School of Tropical Medicine, and resident medical officer, Carmichael Hospital, Calcutta.

Catherine Frances Taylor, M.B.
Universities Mission, Central Africa, Masasi, Lindi, Tanganyika Territory.

Captain Harold D. R. Zscherpel, M.R.C.S., I.M.S.
Superintendent, central jail, Peshawar, North-West Frontier Province.

Kaisar-i-Hind Gold Medal

Nilakanta Sivakamu, M.R.C.P.I.
Principal Zenana medical officer, Bikaner state, Rajputana.

Theodore Howard Somervell, F.R.C.S.
In charge of the London Mission Hospital, Neyyoor, Travancore.

Bar to Kaisar-i-Hind Gold Medal

Ida Sophia Scudder, M.D.
Principal, The Missionary Medical College for Women, and superintendent, The Missionary Medical College Hospital, Vellore, North Arcot district, Madras.

PARIS

(FROM OUR OWN CORRESPONDENT)

NOISE

THE noise nuisance commission, with Prof. Tanon as its mouthpiece, gave its opinion at a meeting of the Academy of Medicine on Dec. 6 on the proposals of the Touring Club de France to deal with traffic and other noises. The Academy withheld its unconditional endorsement of the suggestions pending the issue of a more complete report by the commission. Paris police regulations have already done much to sweeten the harsher notes of motor-horns between 8 P.M. and 8 A.M. The church, too, has contributed its mite, Cardinal Verdier having recommended confinement of the Angelus to 7 o'clock. But certain places, such as railway termini, where the luminous signal has apparently to be supplemented by the sound signal, continue to offend the ears of their neighbours.

HEALTH OF FRENCH EQUATORIAL AFRICA

Prof. Achard, secretary-general to the Academy of Medicine, has lately paid a visit of inspection, under the auspices of the Ministry of the Colonies, to French Equatorial Africa. He took the Belgian Congo in his stride and was thus able to compare the colonial administrations of two different countries. French Equatorial Africa has a population of 3,450,000 and only one doctor for every 36,000 inhabitants and for every 23,000 square kilometres. Hitherto complete failure has followed the attempt to dilute the colonial medical service with native orderlies required to manage stations without any doctors. Until this system can be made to work satisfactorily—and many years will be needed—Prof. Achard suggests that fully qualified European nurses should be sent out to care for the sick. There is need for a better supply of mobile field health units composed of one doctor, one European orderly, and 15 native orderlies, with two motor-cars at their disposal. He thinks that the air ambulance services should also be expanded because of the vast spaces and the impassable condition of the roads during part of the year. Malaria remains the great colonial scourge with a general morbidity of 3·6 per cent., but it is trypanosomiasis which is most dreaded by the natives. Experts in both the Belgian Congo and French Equatorial Africa were reassuring as to the efficiency of the rational treatment of the latter. On the other hand, Prof. Achard was disappointed with the results of the treatment of leprosy.

PENALTY FOR IGNORANCE OF LEGAL NICETIES

A doctor who cures all ills by tickling the sympathetic nervous system in the nose has just been involved in a law suit. It was advertised that he would himself give treatment in the provinces, and when the patients discovered that their treatment was actually administered by someone else they brought an action against both the doctor and his substitutes. The case went in the doctor's favour in the first instance, but on appeal several thousand francs damages were awarded to the patients. The sifting of black sheep from the medical fold is in the hands of the "Office de Répression de l'Exercice Illégal de la Médecine" directed by the Seine Medical Syndicate. Last year this body lodged 53 complaints with the prefect of police, dealt with 222 *affaires* and secured 36 convictions with damages amounting to 39,450 francs, though only 10,700 francs was finally paid.

AUSTRALIA

(FROM OUR OWN CORRESPONDENT)

NATIONAL INSURANCE POSTPONED

THE introduction of national insurance in Australia has now been postponed until Sept. 4, 1939, nine months later than originally contemplated and four months later than the date fixed under amended legislation which has now been withdrawn. This is the upshot of a crisis following a demand by a powerful section of the Country Party, which claimed that record defence expenditure of £63,000,000, combined with low price levels for primary production, made an indefinite postponement necessary in the interests of the people. There is a growing feeling in many circles that the scheme may never be put into execution, for it has been the subject of vigorous attack from several quarters. First, there is the Federal Labour Opposition. When the measure was placed on the statute book a few months ago it was passed only by a very small majority after one of the longest debates in Australian history. Since then the nationalist government, by several of its actions, has suffered considerable loss of public confidence. Next, there is a section of employers who regard with misgiving the charge they will be required to carry as contributors to the scheme on behalf of their employees, and a body of rural opinion which voices the grievances of small farmers who will have to pay contributions for persons they employ, but who will not themselves, as self-employing persons, be eligible to become insured. Finally, there is the difficulty of determining the remuneration of insurance practitioners. The royal commission set up to investigate this last question has not yet made any decision. In presenting evidence to the commission, the British Medical Association in Australia has been particularly unfortunate. A recent plane disaster in Victoria was responsible not only for the destruction of a large portion of this evidence, collected and prepared at great expense of time and money, but also for the death of four of their solicitors and an accountant. This has been a severe handicap in the presentation of their case.

Whatever the finding of the commission it is doubtful whether coöperation between the government and the profession will be obtained. A resolution carried in Melbourne by the federal council of the British Medical Association, for instance, presages serious delay to the operation of the present Act. Under this motion members of the association are asked to pledge themselves not to accept service unless 70 per cent. of members agree to do so. One Melbourne doctor has distributed 3500 eight-page anti-insurance pamphlets to British Medical Association members all over Australia—an action which has considerably perturbed the federal treasurer. It is felt that the profession can only coöperate fully in a scheme of health insurance which is entirely separated from any scheme for the provision of cash benefits. It is also contended that medical service should be complete—that it should include the insured man's wife and family, and that it should provide all forms of medical treatment. Now, it is said, is the time for collaboration in the evolution of a scheme of health insurance which will be a true health insurance, designed for the welfare of the poorer people, and including in its scope not merely a few services for the wage earner, but good general services for the unemployed and the unemployable, and for the breadwinner and his dependants.

It may reasonably be doubted whether national health insurance will now be implemented in Australia. Whether it be or no, the medical profession has not been sparing in its efforts to obtain a worthy and efficient health service.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

INDICTMENT OF THE AMERICAN MEDICAL ASSOCIATION

A SPECIAL federal grand jury sitting in the district court for the District of Columbia today (Dec. 20) concluded its session and returned an indictment naming as defendants the American Medical Association, the medical societies of the District of Columbia and of Harris County, Texas, the Washington Academy of Surgery, and 21 individual physicians. Among the latter are five officials employed by the American Medical Association, including Dr. Olin West, its secretary and general manager, and Dr. Morris Fishbein, editor of its journal. These five full-time officials are said to "have been largely instrumental in forming and effectuating its policies," a charge which definitely implies that they have usurped the authority of the house of delegates of the association. As "background" to the conspiracy the indictment notes that:

"In the last few decades great and unprecedented advances in medical knowledge have occurred. No single doctor now knows or can know enough medical science to enable him to render complete and adequate medical care. Specialization in the rendition of medical care has necessarily resulted. Costly diagnostic and therapeutic equipment and facilities have now become essential for the rendition of complete and adequate medical care. The cost of complete and adequate medical care has increased substantially."

Experiment with group practice may contribute to the solution of the problem of providing complete and adequate medical care to all of the people.

"There is reason to believe, and a large body of informed opinion holds, that the supplying of medical care in this manner . . . may be so organized as to obtain qualified doctors and to afford those doctors conditions of practice which are conducive to a high quality of medical service satisfactory to both doctor and patient and which enable the said doctors to find satisfaction in their work and to obtain a stable adequate net income. . . ."

The indictment proceeds to review the advantages of association in medical societies, the importance of consultation in medical practice, the method of staff appointments, and the significance of exclusion from the staffs of the Washington hospitals. It then proceeds to relate events which have to a large extent already been reported in these letters and which it is charged constitute evidence of a conspiracy to restrain Group Health Association, Inc., in its business of arranging for the provision of medical care and hospitalisation to its members.

Informed of the indictment, Dr. Fishbein drew attention to the following report of a reference committee of the house of delegates adopted by the house at its special meeting on Sept. 17 last:—

"Your reference committee highly commends the Board of Trustees for its willingness to submit to investigation by any authorized agency on the nature of its organization, work, conduct and activity. Firm in a belief in the probity of our officers, and confident of their adherence to established federal law, your reference committee recommends that, in the event of an indictment, this House of Delegates give full support to the Board of Trustees in defending such litigation to the utmost, with every means in its power, exhausting, if necessary, the last recourse of distinguished legal talent, to establish the ultimate right of organized medicine to use its disciplines to oppose types of contract practice damaging to the health of the public."

The suggestion has been made that the attorney-general's office may find two serious stumbling-blocks in the way of securing a conviction under this indictment. Since the proceedings are taken under the Sherman Anti-trust Act it will be necessary, it is said, for them to prove first that medicine is a trade, and secondly, that it is involved in inter-state commerce.

MEDICAL INSURANCE IN THE DISTRICT OF COLUMBIA

A dispatch from Houston, Texas, states that four charges of unethical practice made against Dr. Raymond Selders have been dismissed by the Harris County Medical Society. Dr. Selders is medical director of Group Health Association of Washington, D.C. The pædiatrician in this association, Dr. Mario Scandiffio, has appealed against his expulsion from the District of Columbia Medical Society. Hearing of the appeal has been postponed by the judicial council of the A.M.A. from Dec. 10 to Jan. 13. At the present time pledges to the Community Chest Fund in Washington this year are being endorsed by large numbers of people with the condition that they will become payable only when the Chest ceases to patronise hospitals that discriminate against Group Health Association. On Dec. 10 the District of Columbia Medical Society announced a plan of "mutual health service" for low-income groups. The service will be directed by nine trustees, one to be nominated by the U.S. Public Health Service, two by the subscribers, one by the district health department, and five by the medical society. Subscribers will be accepted in groups of not less than ten, but business houses may combine if necessary to make up this minimum. At least 70 per cent. of persons in any eligible group must join. Dues, subject to revision, will be $1.50 per month for a single person, $2.50 for husband and wife, $3.50 a month for a family. Drugs and appliances are not included, but consultant, X ray, and laboratory services will be provided. No treatment will be given for mental illness, epilepsy, alcoholism, drug addiction, and conditions covered by the workmen's compensation law. The announcement states: "It is conceivable that there may not be as great a demand for a prepayment medical service program as is anticipated. However this can only be determined by trial. The important thing is that the medical profession make a serious effort to meet the apparent needs and demands of the people."

MEDICAL INDEMNITY INSURANCE

Dr. C. G. Heyd, a former president of the American Medical Association, outlined a plan for medical indemnity insurance which is now sponsored by the medical society of the state of New York and which accords with the resolution taken by the recent special session of the house of delegates. The subscriber who pays $1 per month becomes entitled to a credit of $150 for his doctor's bill; or he may pay $2 and obtain $300 credit. He may even insure himself up to $500, but Dr. Heyd points out that the credit of $150 will be just as good as one of $500 since doctors always have adjusted their fees to the patient's financial resources.

The plan was presented to the Bronx County Medical Society and was criticised by Dr. Kingsley Roberts, medical director of the Bureau of Coöperative Medicine, because it offers no adequate diagnostic service beyond that which can be rendered in a physician's office, because it disregards the necessity for preventive medicine, and on other grounds.

THE IRISH ARMY MEDICAL SERVICE

(FROM OUR DUBLIN CORRESPONDENT)

THE executive committee of the Irish Free State Medical Union has taken strong action in advising members of the medical profession to refrain from applying for any appointment in the Irish army medical service or army medical reserve without first communicating with the medical secretary of the union. The step has been forced on the union by the unsatisfactory conditions of the service as regards both pay and pensions.

The army medical service was first got together in 1922 when the established government was faced by an armed revolt. The organisation was at first inevitably experimental and crude, and the personnel consisted mainly of young men who offered their services as a patriotic duty in a time of emergency. They were men of good quality and when organised a little later formed a service, small in numbers, but of high efficiency. They had joined the army without waiting to consider terms, but when rates of pay were settled these were not considered unsatisfactory, and were probably, taken all round, on a par with those current in the Royal Army Medical Corps. The rates of pension remained unsettled and it was only in 1937 that an army order fixing pension rates was issued, without any previous consultation either with the army medical officers or with representatives of the civil profession. In the meantime the strength of the service as regards commissioned ranks had been gradually reduced from over a hundred to a little over twenty. As no officer could retire without the permission of the army authorities, the small number remaining probably included those of the highest efficiency.

When however the order fixing pensions came to be issued toward the end of 1937 it caused dismay to the serving officers. The rate of pensions was fixed relative to rank in the army, and had no relation to the pay at time of retirement. In consequence of the adoption of this principle it was found that a medical officer on retirement after full service would be entitled to a maximum pension of a little over one-third of his pay at time of retirement, while a line officer would receive approximately two-thirds of his retiring pay. Not only were the rates of pension unsatisfactory, but the conditions under which pensions were to be granted were more so. In the first place an officer could not leave the service without receiving the permission of the minister for defence, and in the second, if permitted to retire he could not leave Ireland without the minister's permission. As the scheme stood, a retired officer could not live without obtaining employment to supplement his pension. There is little or no market in Ireland for the professional services of a medical officer who had spent several years in military life, and a retired officer's only chance of gaining a livelihood would have been by migrating to Great Britain or abroad. The pensions scheme was strongly criticised in the Dáil, and was criticised in the press by the medical union, but the minister persisted. He even refused to hear the representatives of a deputation from the union. After the delay of a year, however, he relented on the latter point, and on Nov. 19, 1938, he received a deputation from the executive committee of the union, who put the case fully before him. He held out no hopes of any amendment in the scheme of pensions but promised to give careful consideration to the arguments he had heard. He also informed the deputation that he had it in contemplation to reduce the serving pay of future entrants to the army medical service. This intention he carried into effect by an army order issued only twelve days later.

This order has caused even more dissatisfaction than the order concerned with pensions. The basic principle of the scheme is to fix a scale applicable to officers of every branch, the scale running from 8*s*. a day for a second lieutenant to £1000 a year for a lieut.-general, a rank which is unoccupied at present. Additional pay will be given to officers for whom a professional education was necessary before entering the army. In the case of medical officers the additional pay will be £150 a year in the case of a second lieutenant and £120 a year for all higher ranks. The maximum pay attainable in the ranks of captain, commandant, and major will in future be £448 10*s*., £558, and £631 respectively, whereas the maximum rates at present attainable are £730, £857, and £1100. In fact the maximum pay of a major—the highest rank at present held in the army medical service—will be lower than the maximum pay at present attainable by a captain. The new rates of pay came into force on the date of the order. It is true that the present pay of existing officers is not interfered with, but on the other hand in no case will promotion to a higher rank bring any increase of pay. In such circumstances it is unlikely that an officer will be willing to accept promotion, since promotion will increase responsibility without any increase of remuneration.

The executive committee of the medical union is dissatisfied also with the creation of a rank of second lieutenant in the medical service, a rank which does not usually exist in the medical or other professional branches of an army. Moreover, there is discontent over the fact that there is no regular procedure for admission to the army medical service. Vacancies are few but they have occurred and are apparently filled privately, for no public announcement of vacancies is made, and young medical men in general are not given an opportunity of offering themselves as candidates. It is held that the appointments to an important public service should be made by a recognised machinery and not by patronage privately exercised.

As a rule it is in the late forties or early fifties that the greatest ethical demands are made upon the individual. He must consent finally to the surrender of some personal ambitions for himself, he must abandon the last vestiges of narcissism, he must find a philosophy to meet the needs of his advancing years. He is at the parting of the ways, one way being a process of continued sublimation, the other of regression, lost courage, and futile depression. . . . Difficulty of adaptation to the approach of declining bodily vigour, with failure of satisfactory sublimation, may result in injudicious enthusiasm for some special theory or cult in place of a real philosophy of life. A sound philosophy of life, practical as well as theoretical, harmonising biological and psychological needs and leading up to a supra-temporal and duly coördinated system of values and a serene and courageous spiritual outlook, gives the highest degree of unity, vigour and permanence of the personality, and leads to true happiness.—WILLIAM BROWN, *J. ment Sci.* November, 1938, p. 1066.

LETTERS TO THE EDITOR

DAMAGES FOR NERVOUS SHOCK

SIR,—Under the heading Medicine and the Law in your issue of Dec. 24 it is shown that there is a gradually increasing tendency on the part of the courts to award damages for mental or nervous shock. The Court of Appeal holds that mental or nervous shock may be less obvious to the layman than a broken limb but that "nowadays it is equally ascertainable to the physician." Your comment on all this is that "as medical science has become better able to describe and classify mental and nervous symptoms, the courts have appreciated their significance." It is not unfair to deduce that you approve of this tendency on the part of the judges. From this opinion of yours I beg to offer respectful dissent. I do not think that the majority of those who have specially studied these cases would agree with you. There are many who think that recent decisions, where damages have been awarded, have caused a great multiplication of these cases—not only a multiplication of cases brought before the courts but of the actual incidence of these special neuroses.

Shock, whether due to physical or psychical trauma, is a temporary affair, lasting from a few minutes to a few days at farthest. It ends either in death or in recovery. In the latter event the amount of damages to be awarded should surely never be great. Shock may be followed by severe neurosis, but I should have thought that by now it was agreed that neither the trauma nor the shock was the cause of the neurosis—that there was always something else, most commonly some advantage to be gained by the person who developed an illness which could be attributed to the trauma. At present the commonest causal factor is the possibility, rapidly becoming a certainty, of monetary gain. Between 1914 and 1918 the chief factor was the hope of escape from intolerable danger. Those of us not exposed to these inducements towards illness need not feel superior about these things. These factors are almost always unconscious; nevertheless it is our duty as doctors to strive that they shall not be fostered.

Compare all this with the freedom from subsequent neurosis after severe physical trauma when no gain will follow illness, as in hunting accidents, winter-sports accidents, amateur-football accidents, and we can have little doubt that trauma and shock by themselves do not cause neurosis, and that the present alarming increase of these cases is due to illness having been allowed to acquire value.

Names are of some importance, and it is time that we dropped the misleading term "traumatic neurosis" and substituted the more truly descriptive one of "compensation neurosis."

What has been said of physical trauma and shock is equally true of psychical trauma and shock. There is always another psychical factor. In the past this was often something like self-reproach or remorse; in future we shall have to add cupidity.

Lastly, it would be interesting to know who are the physicians who can as easily measure in figures the effect of fear as the surgeon can the shortening or angular deformity of a limb; that would be "equal ascertainability." They do not write papers on the subject, so most of us are left in the dark.

I am, Sir, yours faithfully,

T. A. ROSS.

Devonshire Place, London, W.1, Dec. 31.

THE FEET OF THE INDUSTRIAL WORKER

SIR,—The symposium published in your issue of Dec. 24 shows how many considerations enter into the subject of foot incapacity. In regard to the prevention of foot-strain and flat-foot, statistics are available showing the advantage of preventive measures in special classes of workers who have to spend long hours on their feet. Thus at a certain large hospital in the United States the nurses have a detailed examination of the feet done under the following headings: (1) previous history of rheumatism or foot trouble; (2) number of hours a day on feet previously; (3) flexibility of feet with especial reference to dorsal flexion; (4) points of tenderness; (5) examination of the forefoot; (6) height of arches during weight-bearing; (7) callosities and corns; (8) type of shoe being worn; (9) muscle balance, with test of abductor and adductor groups; and (10) remarks and recommendations. The need for a proper shoe is explained—namely, one that is sufficiently long and allows clearance for the great toe on weight-bearing. The point of the toe can be neat and yet be carried inwards to be opposite the great toe. The heel is broad and about $1\frac{3}{4}$ in. in height, or a little lower. Lasts suitable for individual needs are made, and Thomas or "crooked" heels may be prescribed. The shoe has to have a stout sole. Of 133 nurses examined at the hospital in question, 84 were in need of advice. Of a group of young women at college, 80 per cent. showed potential foot-strain and 10 per cent. active pain. Not a few people are just careless about shoes. For example, someone may be observed doing a full day's hard work on stone floors wearing thin-soled dancing slippers.

As to curative measures, stirrup strapping to support the main arch may tide the patient over an awkward period. The ordinary adhesive strapping is used and it may be kept up for quite a long time. A Thomas or "crooked" heel requires that the front inner corner of the heel be advanced 1 in. and elevated by $\frac{1}{4}$ in., along with $\frac{1}{2}$ in. raise all along the inner border of the heel. The tip should be capped with steel or rubber composition to prevent wear. This exerts a direct supinating thrust beneath the longitudinal arch, and its action and corrective physiological effect may be increased by elevating the outer side of the sole by 3/16 in. When the muscles are poor—and very often this is an expression in part or in whole of poor bodily mechanics generally—a foot support of the Whitman type can be of great value in selected cases. The tilted foot-plate of Lloyd Brown acts also in assisting a physiological cure. The plate is made from a plaster model, and can consist of lighter-gauge steel than the ordinary plate. The tilting of the heel part of the plate is done by making an inside flange at the back of the heel, which in finishing is twisted underneath to extend half-way across the heel-plate. The outside of the heel is thus kept low, while the inside can be made of any height wanted. An outside flange keeps the foot from sliding off the plate. The rest of the plate is made to fit the arch. While the head of the talus tends to pass downwards and inwards in the pronated position of flat-foot, it has to be realised that the calcaneus, cuboid, and navicular tend to tilt and roll outwards. It is analogous in some respects to the opposite state of affairs that occurs in congenital club-foot or talipes equinovarus. The tilted heel-plate prevents valgus

of the calcaneus when the foot is put on the ground and so places the muscles in a position of advantage. The muscular force for supporting the main longitudinal arch has to come not only at the attachments of the muscles but also, and even more so, at the medial malleolus and the sustentaculum tali. The action of the flexor longus hallucis must be emphasised. As it extends behind the medial malleolus it passes beneath the sustentaculum tali, which serves as a pulley to change the direction of the pull. With the great toe fixed, contraction of this muscle elevates the sustentaculum tali and supports the arch. It will be evident, therefore, that in hallux valgus, and especially in the type of hallux valgus associated with an inherently weak forefoot—i.e., where the first metatarsal bone is congenitally short, hypermobile, and set obliquely at its basal joint—the flexor longus hallucis muscle cannot act properly. Balancing the posterior part of the foot in some early cases of hallux valgus may go far to alleviate the condition. I consider that an underlying cause of hallux rigidus is not infrequently the unavailing and almost spastic effort of the flexor longus hallucis muscle to exert its proper function in bracing up the sustentaculum tali in an unbalanced foot. The muscles of the foot have not a simple action. While their action is supportive in the supinated foot, the action is reversed in the pronated foot. Preservation of normal foot balance depends upon the supinating muscles being stronger than the pronating muscles. Osgood has shown that in the normal foot the ratio is 5 : 4 in favour of the supinators. In weak feet the balance is even, and in foot-strain the ratio is reversed.

The bones, joints, fascia, ligaments, and muscles—especially the two last named—have to work as a synergic unit during weight-bearing and progression. It is of particular importance to recognise the correct common inter-relationship which must be imposed upon the talus, calcaneus, cuboid, and navicular if proper balance of the foot is to be preserved. If the muscles begin to fail, the ligaments—their partners and associated line of defence in sustaining the synarthrodial position suitable for right use—lose their correct tension in time and give way also. Ligaments are not simple, strap-like structures. They are living structures endowed through their peculiar internal constitution, as O'Connell has pointed out, with a tensile strength and stretchability which he likens to that of a cardigan jersey. They have a vital elasticity which will stretch thus far and no further, if their inherent capacity to shorten up again when stress, injury, and disease are removed is not to be destroyed. The muscles and the ligaments act in a wonderful way as one unit in the correlation of the structure and function of joints. If habitually pushed beyond their normal physiological limits, the structure, and therefore the function, of the ligaments becomes altered and the foot becomes fixed and painful. To restore the free excursion of the joints is our first duty, to protect the ligaments during recovery is the second, and to restore tone and balanced action of the muscles is the third.

Faulty use of the foot is not infrequently an expression of bad bodily mechanics and posture of the body as a whole. The leg and foot muscles cannot work properly if a person turns his toes out in walking and has poor carriage. Very often, therefore, attention has to be given to the physical education of the patient to re-educate him in the erect use of the whole body. The orthopædist has a great national duty in this regard. The evolutionary history of human development has taken place along postural lines and the evolutionary lever has lain in the constantly acting postural tonus of the anti-gravity muscles. It is not possible, so bad are man's sensory impressions, to attain the fully erect position of the body without training of a special kind, and I submit that it is due to the lack of this understanding and its daily application in living that so much physiological and even pathological deformity in its widest sense exists today. This whole field of endeavour awaits our enthusiastic support as a profession. Surely we should not be content with the second best in life and allow flat-feet, knock-knees, relaxed abdomens, hollow backs, round shoulders, and flat chests to abound in the community, with all the lowered vitality and psychosomatic consequences they bring in their train. All the detail for the physical restoration of these people—by rehabilitating rest to recover lost tone, by re-education in correct breathing and voluntary control of the trunk and abdominal muscles—are well known and practised by orthopædists. It is a complete art in itself, this correction of faulty use of the body, and the attainment of the physical ideal in young and old. If an orthopædic training has taught me anything, it is the widespread urgency of the problem in our country to-day. Let us unite to cure the "chronic case" by the practice of real orthopædics. It is the chief raison-d'être of the specialty.

I am, Sir, yours faithfully,

Edinburgh, Dec. 30. W. A. COCHRANE.

CONTROL OF SMALLPOX

SIR,—At the beginning of 1938 we had Dr. C. C. Okell (THE LANCET, Jan. 1) writing very frankly about compulsory vaccination in the control of smallpox, and now at the end of the year (THE LANCET, Dec. 24) we have Dr. Duncan Forbes, the veteran medical officer of health for Brighton, writing equally frankly.

As Dr. Okell's remarks did not appear under the head of smallpox and vaccination, but in your column Grains and Scruples, it is possible that some of your readers interested in the subject may have missed them; and in any case it is now twelve months ago, so I venture to quote them:

"We have lived through some striking changes in the attitude to small-pox vaccination. Compulsory vaccination which once had the suffrage of the nation has now hardly a serious supporter. We are ashamed to jettison the idea completely and perhaps afraid that if we did the accident of some future epidemic might put us in the wrong. We prefer to let compulsory vaccination die a natural death and are relieved that the general public is not curious enough to demand an inquest. . . ."

I believe that there are very many other medical officers of health besides Dr. Duncan Forbes, who, although quite convinced of the effect of vaccination in protecting the individual, have come to have very serious doubts as to its effect in protecting the community and who would be quite prepared to endorse the utterances of both Dr. Forbes and Dr. Okell. Moreover, judging by his official utterances, there is good reason to believe that Sir Arthur MacNalty, chief medical officer of the Ministry of Health, is also not unsympathetic.

Is it too much to hope that the new year upon which we have now entered may see this old controversy—the need for compulsory vaccination—advanced yet a further stage towards solution?

I am, Sir, yours faithfully,

Leicester, Jan. 1. C. KILLICK MILLARD.

OILY SUSPENSIONS OF SULPHANILAMIDE COMPOUNDS

SIR,—In the Bradshaw lecture which you published on Nov. 12 Dr. Whitby suggests that in certain instances sulphapyridine [2-(*p*-aminobenzenesulphonamido) pyridine] be given parenterally in olive-oil suspensions. Later (Nov. 26) Drs. Hobson and MacQuaide reported on the parenteral use of oily suspensions of sulphapyridine in the treatment of patients ill with meningococcal meningitis.

This seems to us a thoroughly rash procedure. During the past 2½ years we have encountered more than thirty instances of acute hæmolytic anæmia and two of agranulocytosis among the patients who have received sulphanilamide in the Johns Hopkins Hospital. These untoward reactions apparently represent an idiosyncrasy on the part of the patient towards the drug. In patients who develop these severe toxic manifestations it has been our practice to force fluids vigorously in order to eliminate the offending drug as rapidly as possible. This treatment has been successful, for all of these patients have recovered from the toxic reaction.

It has seemed to us that the parenteral use of oily suspensions of the poorly soluble sulphanilamide derivatives is dangerous because their absorption from the tissues is slow and this makes their rapid elimination from the body, in case of necessity, difficult. Sulphapyridine is a poorly soluble compound and, under experimental conditions, is absorbed slowly when injected as a suspension in oil. Two rabbits were given single intramuscular injections (0·1 g. per kg.) of olive-oil suspensions of the drug; one rabbit received 330 mg. and the other 280 mg. At the end of one week both animals were still excreting sulphapyridine in their urine. The first had excreted a total of 211·3 mg., while the second had excreted 230·2 mg. It is probable that the drug is absorbed slowly by man also, following its parenteral injection in oil, so that if one were faced by a severe toxic reaction one might find it difficult to hasten its elimination from the body. We know already that many of the toxic manifestations of sulphanilamide are reproduced by sulphapyridine—rashes, hepatitis, acute hæmolytic anæmia, and agranulocytosis have all been reported as occurring in the course of sulphapyridine therapy.

We therefore consider the use of sulphapyridine in oily suspensions to be an unsafe and even dangerous procedure. I am, Sir, yours faithfully,

Baltimore, Maryland, Dec. 20. PERRIN H. LONG.

GRAINS AND SCRUPLES

SIR,—May I call attention to the recent brilliant contribution of An Anatomist to Grains and Scruples? The element of accident so much determines what we read and what we do not read that I am overcome with anxiety lest those who are better qualified than I to comment on his speculations concerning the origin of man should fail to come across them.

This is an age of revaluation, and An Anatomist has re-submitted man to scrutiny and found that his nearest relation on this earth is not, as we had hitherto believed, the ape, but the pig. Phylogenetically we are bound to the pig, and inwardly protest as we may, we must accept his findings. But are we linked in mind as well as body? It is to the investigation of this mental cousinship that the anatomist now looks forward, and those of us who have leaned over the gate of a stye and been overwhelmed with a feeling of kinship, will not shrink from this task. If we are pigs, let us at least be enlightened pigs. And it is in the hope that this letter may direct the attention of psychologists to a study of swine psychology that it is written. Why waste time on rats and apes when pigs are available? Let every psychologist keep his stye, thereby not only providing himself with a rich field of research, but with a profitable side-line to an otherwise poorly paid branch of medicine.

In this letter may possibly be detected a note of facetiousness. If this be so, it has no relation to my attitude to An Anatomist's contribution to Grains and Scruples, which I hold to be one of the most masterly and interesting articles that has yet appeared under that heading.

I am, Sir, yours faithfully,

Harley Street, W.1, Dec. 30. KENNETH WALKER.

SIR,—In your last issue An Anatomist very skilfully indicates the many points of resemblance between the genus sus and the genus homo (now represented only by the species *Homo sapiens*). But he has made an omission; for he has forgotten the important similarity in diet. Man is as omnivorous by choice (consuming with equal delight foods as vastly different as snails and bird's nests on the one hand, and rose-petal-jam and fried ants on the other) as the suidæ are by necessity. The French moralist who said that: "Il y a dans tout homme un cochon qui sommeille," has thus taken the first step on the road of research on comparative suido-human psychology.

I am, Sir, yours faithfully,

N. N. TERESHCHENKO.

Westminster Hospital, S.W.1, Dec. 30.

HYPOTENSION

SIR,—The admirable paper by Group-Captain Rook and Flight-Lieutenant Dawson appearing in your last issue should do much in directing attention to the fallacy of accepting blood-pressure readings as absolute criteria; of arbitrarily assuming a standard, any departure from which is an abnormality; and of disregarding the fact that constitutional peculiarities admit a fairly liberal range to the category of the normal. This is more necessary at the present day in respect to hypotension than to the opposite extreme which is more generally related to recognisable pathological states.

If the height of the blood pressure could be exactly or even approximately correlated with physical attributes and functional disturbances or diseased conditions, our work would be very much easier. Confronted with a patient who complains of premature fatigue or unreasonable weariness, in whom a maximum systolic pressure of, say, 108 mm. Hg is discovered, it is not unusual to suppose that his symptoms are directly related to this low level. But the honest observer in the course of routine investigation may next encounter a subject who whilst possessing a maximum pressure no higher than 100 mm. is bursting with health, energy, and good intentions, and will naturally doubt the validity of this criterion.

It appears that there are two types of hypotensives: the first is the athletic and the second the asthenic in whom a change of posture leads to relative anæmia of the medullary centres. For, as the writers of this paper point out, it is not hypotension itself but the frequent though not inevitable accompaniment of an unstable vasomotor mechanism which is responsible for the symptoms in this group. And even this broad

classification is not unequivocal, for the hypotensive athlete occasionally displays this weakness. A temporary toxæmia may be responsible but even in athletes a constitutional instability is not unknown. I recall a distinguished example whose capacity was endorsed by an amateur championship who fainted on the two occasions when the sphygmomanometer band was applied. He was of the emotional type who is notoriously unreliable in his performances and as such he certainly lends support to the importance of the psychological factor in assessing fitness.

The peculiar requirements for flying demand specialised tests for which we look to our colleagues in the R.A.F. Medical Service, although in practice generally we shall not be able to follow them closely. Nor, I imagine, will their task in this particular field ever be easy. My own experience of airmen is very limited but one example is particularly striking. The subject, 6 ft. 3½ in., weighed 9½ st., and had visceroptosis, a hypotonic stomach, and a blood pressure never higher than 95 mm.; one would have thought it difficult to find a better example for summary rejection. Yet his war service in the air was in respect to endurance, response to stress, and to every emergency required, so striking as to be proverbial even to this day.

I am, Sir, yours faithfully,

Brook Street, W.1, Dec. 31. ADOLPHE ABRAHAMS.

THE "IRON LUNG"

SIR,—In view of the increasing interest being taken in treatment with the Drinker respirator, may I venture on a word of caution as to the kind of case for which it is unsuitable? Recently a woman, gravely ill, suffering from dyspnœa, was sent here for treatment in the Drinker. Her dyspnœa was due to heart failure and broncho-pneumonia and as the condition was unsuitable for the respirator she was placed in an oxygen-tent, with some relief. Further, in any case treated in the Drinker, but particularly in those with bulbar paralysis, great care must be taken to see that the airway be free from an excess of mucus and saliva which would be sucked into the trachea and bronchi with disastrous results. During the 4½ years the Drinker respirators have been in use in this hospital we have employed a suction apparatus, sometimes combined with postural drainage, for this purpose.

I am, Sir, yours faithfully,

URSULA BLACKWELL.

Western Hospital, Fulham, S.W.6, Dec. 27.

TREATMENT OF LOBAR PNEUMONIA WITH M. & B. 693

SIR,—I have studied with great interest the reports and correspondence on M. & B. 693 published in THE LANCET. I have had an opportunity of treating 6 cases of lobar pneumonia with this drug and have made some observations that may be of interest.

All the patients had a characteristic history and signs of lobar consolidation. Typing of the pneumococcus from the sputum yielded the following results: types I, III, XIV, XVII, XVIII, and XXIV (each one case). The temperature and pulse-rate always fell to normal in 12–30 hours, and an improvement in the clinical condition followed. One man, aged 73, had consolidation of the whole of the left lung when the treatment began six days from the onset, and a blood-urea between 150 and 200 mg. per 100 ml. of blood. Nevertheless his temperature fell steadily and gradually to normal in 30 hours, though the pulse-rate remained between 110 and 120. He died suddenly 24 hours after the fall of temperature. I have been much impressed by the short space of time that resolution has taken in our patients—an important question raised by Dr. Barber in your issue of Dec. 10th. The dullness and tubular breathing disappear in a few days, and the cough ceases within a week or less.

One of the patients, a man aged 19, had a visible hæmaturia on the 5th day of treatment. The urine was acid (*p*H 5) and sodium bicarbonate was accordingly administered, the dose being 10 g. three times a day. Despite continued treatment with M. & B. 693 the hæmaturia disappeared in 4 days. Because of a relapse arising from discontinuance of the drug the total dose was as high as 43 g. In the absence of another explanation this hæmaturia may be considered as having been caused by the drug. I have not observed granulocytopenia.

I am, Sir, yours faithfully,

PER HANSSEN.

University Medical Clinic A, Oslo, Norway, Dec. 28.

A NEW REMEDY FOR EPILEPSY?

SIR,—I think that Dr. William Lennox's communication to your journal last week requires a further reply from me. Naturally, before writing my original letter to THE LANCET, I had access to Merritt and Putnam's two articles and fully realised that Nirvanol and Dilantin (marketed in this country as Epanutin) have certain chemical differences. The hydantoin group is common to both, but the sodium salt is no doubt less toxic than nirvanol. At the same time I was struck with the occasional more serious "toxic reactions in the nature of dermatitis and purpura" mentioned in Merritt and Putnam's article (*J. Amer. med. Ass.* Sept. 17, 1938). These authors also quote a case of exfoliative dermatitis. All these reactions are identical with those obtained from time to time with the older form of hydantoin compound, and I still believe that I was right in warning medical men not to embark upon this form of therapy too light-heartedly and without regard to the possible poisonous effects produced.

It is only fair to say that I myself am cautiously trying the treatment in children with epilepsy and so far I have had no toxic results. But then I also, personally, have not had many alarming reactions with nirvanol, though others have reported these, and fatalities have even been mentioned.

I am, Sir, yours faithfully,

BERNARD SCHLESINGER.

Portland Place, W.1, Jan. 2.

MULTIPLE ANÆSTHESIA

SIR,—The correspondence lately appearing under this heading gives one the impression that the innocent patient, before falling into the hands of a wicked modern anæsthetist, has never been guilty of the indiscretion of taking more than one drug at a time. Every doctor knows that this is untrue. I made inquiries into the drugs taken before operation by six patients that I have anæsthetised recently, and I found that the total number of drugs in their prescriptions was anything from ten to twenty a day. Yet when the anæsthetist gives five drugs—notwithstanding the fact that he keeps the patient under the closest observation the whole time the drugs are exerting their maximum effect—his technique is called in question. When a surgeon uses two sharp instruments in place of one blunt one it is called "modern surgery"; when an anæsthetist does the same thing it is called an "anæsthetic cocktail."

I am, Sir, yours faithfully,

Hove, Sussex, Dec. 28. REX BINNING.

ADAPTING THE LIMB TO THE STUMP

SIR,—Mr. Jenner Verrall, in his letter published on Dec. 24, seems to imply that coöperation between surgeons and limb-fitters exists only at Queen Mary's (Roehampton) Hospital; but this is surely far from the truth. It has always been my custom to consult with Mr. Desoutter regarding my amputation cases, and he has afterwards arranged the preparation of the stump for limb fitting; a most important point to my mind. If this was a routine procedure in every hospital, there would be many less disappointments. One has only to visit the works of Desoutter Brothers, at Hendon, to see what a difference exists in the final result between the good and bad amputation stump.

I do not agree that many of the amputations described in textbooks are obsolete, nor that the Syme amputation is obsolete. Certainly the Syme amputations performed in the late war gave poor results, but this was to be expected as they were performed under poor conditions, and the majority of the cases suppurated. The old orthodox Syme's amputation has great disadvantages, but surely nobody describes it or makes use of it today. The modified Syme amputation, in which the tibia and fibula are sawn across 1 in. above the articular surface of the tibia, gives an excellent stump. Such an amputation leaves sufficient room for a mechanical ankle-joint in the artificial limb, and there is less loose flesh, and therefore less likelihood of the end-bearing stump loosening.

I am, Sir, yours faithfully,

CECIL P. G. WAKELEY.

Devonshire Street, W.1, Dec. 31.

RESUSCITATION AFTER ELECTRIC SHOCK

SIR,—During the year 1937 no less than 583 industrial accidents due to "electricity" were reported to the factory department of the Home Office, and of these 35 proved fatal. Any possible improvements of the methods for dealing with patients rendered unconscious by electric shock are therefore important.

A suggestion has reached me from the British Thomson-Houston Co., Ltd., that an "iron lung" (or Drinker respirator) might be installed in factories and other places in which there are special risks of electric shock. The successful treatment of electric shock depends largely on the prolonged and continuous application of artificial respiration. Recovery has been known to take place as long as three hours after the accident. Success often depends upon the use of sound methods of artificial respiration and on persistence in them. It is known also that deaths have been caused by the use of incorrect methods and especially by rough handling of the patient. It therefore appears that there should be a useful place for the Drinker respirator in the treatment of electric shock, provided the patient can be safely transported to it.

Sir Henry Gauvain, writing in your issue of Dec. 3 (p. 1327), has pointed out that the "iron lung" demands highly skilled personnel to operate it successfully. This personnel consists of trained doctors and nurses and a skilled mechanic. The apparatus must always be kept in working order. In certain large industrial undertakings these conditions could be fulfilled. But in general this is not the case.

Nevertheless a method is available that would overcome this difficulty and enable the electrocuted person to be brought from the site of the accident to the nearest hospital. In 1932 Dr. F. C. Eve invented the "rocking stretcher" (*Lancet*, 1932, **2**, 32). In a joint paper published in 1933 (*Ibid*, 1933, **2**, 740) Drs. Esther Killick and Eve showed that artificial respiration by means of the rocking stretcher was highly efficient, safe, and easy to perform and needed a minimum of skill. The principle of the stretcher (which is manufactured by Messrs. Siebe Gorman of London) is to use the dead weight of the abdominal viscera to obtain rhythmical alterations in the size of the thoracic cavity. The stretcher consists of a small metal stand on which is hinged an inclined-plane stretcher. The patient is placed face downwards upon the inclined plane. Fixing straps are adjusted. The stretcher is then rocked upwards and downwards through angles of 45°; the rocking is carried out by hand and is not unduly exhausting. It is only necessary to keep the movements regular and at a normal breathing-rate. When the head is down the weight of the viscera forces the diaphragm upwards, causing air to be expelled from the lungs. When the foot of the stretcher is depressed air is drawn into the lungs. The stretcher is easily portable and can be loaded on to an ambulance or van, and artificial respiration can be continued during the journey to the hospital.

It appears to me that the most efficient "rescue service" for accidents caused by electricity would be:—

1. Schafer's method of artificial respiration pending the arrival, from the works first-aid post, of Eve's rocking stretcher.
2. Rapid transportation on Eve's stretcher to the nearest hospital where, if necessary, the patient could be put into the Drinker respirator.

Would not a "rocking stretcher" be a useful addition to the equipment of all large ambulance stations?

"Shock" is the serious danger in all cases of electrocution and could be much better combated in hospital than at the site of injury. I can find no record of the Drinker respirator having yet been used in this country for resuscitation purposes, though it has probably been used in America. I have heard of one case in which it was successfully used for treatment after an overdose of drugs.

I am, Sir, yours faithfully,

HOWARD E. COLLIER.

Dept. of Industrial Hygiene and Medicine, University of Birmingham, Jan. 3.

BIRMINGHAM CENTRE HOSPITAL.—The new hospital at Edgbaston received its first in-patients on Dec. 31, when fifteen men and fifteen women were transferred from Selly Oak. It is not intended to transfer patients from the General and Queen's Hospitals at the moment, but by the end of this month most of the 250 beds that are now ready will probably be occupied.

MEDICAL SOCIETY OF LONDON.—The second half of the 1938–39 session of this society will begin on Jan. 9 with a pathological meeting. On Jan. 23 Sir Henry Gauvain will open a discussion on poliomyelitis, including artificial aids to respiration. Other discussions and their openers will be: the use and abuse of purgatives (Sir Arthur Hurst and Dr. H. L. Glyn Hughes); principles of modern treatment of fractures of the extremities (Mr. W. Rowley Bristow and Mr. T. P. McMurray); coronary thrombosis (Dr. D. Evan Bedford and Dr. C. Keith Simpson); and the ocular manifestations of general disease (Prof. Edwin Bramwell and Mr. R. Foster Moore). The Lettsomian lectures will be held on Feb. 20 and March 1 and 6 by Prof. Grey Turner, who will speak on the surgery of the gall-bladder and bile-ducts. Prof. John Ryle will deliver the annual oration on May 8. His subject will be clinical sense and clinical science. The society may be addressed at 11, Chandos Street, W.1.

OBITUARY

EDWARD WILBERFORCE GOODALL

O.B.E., M.D. LOND.

Dr. Goodall, a well-known authority on acute infectious diseases, died at a nursing-home in London on Dec. 29 after a short illness, aged 77.

He was born in London in 1861, the son of Mr. E. Goodall of the East India Company. He was educated at Bedford Grammar School, where he became head boy, and received his medical education at Guy's Hospital. He qualified M.B. Lond. in 1885, when he was awarded the gold medal and scholarship in forensic medicine, and took his M.D. in 1886. After holding the posts of resident obstetric officer and house physician at Guy's he was appointed assistant resident medical officer at the London Fever Hospital, where he remained for two years. He was then appointed medical registrar and demonstrator of practical medicine at Guy's, posts which he held for another two years. Goodall never engaged in private practice, but devoted the whole of his subsequent career to the service of the Metropolitan Asylums Board. He was appointed medical superintendent to the Eastern Hospital, Homerton, in 1892, in succession to Alexander Collie, who, though a distinguished epidemiologist, was but a lax administrator, so that Goodall, always a stern but just disciplinarian, had much to do improving the existing conditions. On the outbreak of the war he was appointed temporary lieutenant-colonel in the R.A.M.C., and served in Belgium, where he gained the Mons ribbon and Albert Medal, and in France, where he was in charge of hospitals for infectious cases at Dunkirk and Nevers. In 1916 he was appointed medical superintendent of the North-Western Hospital and in the following year was in temporary charge of the Grove Military Hospital. He was then granted three months' leave at the request of the war victims relief committee of the Society of Friends to assist in fighting the typhus epidemic in Poland. He retired on reaching the age limit in September, 1926.

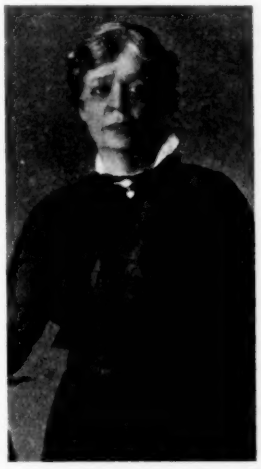
In addition to being a sound and experienced clinician Goodall took a keen interest in morbid anatomy and formed an excellent collection of post-mortem specimens and slides which he showed to the numerous students who attended his courses of instruction in fevers. He was also remarkably good with the pen. His best known work is his "Manual of Infectious Diseases," of which the first edition, written in conjunction with J. W. Washbourn, was published in 1896. At the time of his death he was preparing a fourth edition in collaboration with Dr. William Gunn. He was also the author of "A Short History of the Epidemic Infectious Diseases" and of a biography of William Budd of Bristol, as well as of numerous contributions to the medical journals. He also wrote articles on acute infectious diseases in the "Medical Annual" (1900–03 and 1905–19), Quain's "Dictionary of Medicine," the "Index of Treatment," Garrod, Batten, and Thursfield's "Diseases of Children," and the "Index of Prognosis." Though naturally of a retiring disposition and regarding hospital entertainments as a distasteful duty rather than a pleasure, he was in one sense of the term a society man. Before its amalgamation with the Royal Society of Medicine he was an active member of the Clinical Society, and in 1895 was one of its committee for investigating the value of diphtheria antitoxin. He was a fellow of the Royal Society of Medicine, in which he was president of the sections of epidemiology (1918–20) and history of medicine (1935–37), president of the Hunterian Society, and honorary fellow of the Society of Medical Officers of Health as well as president of the fever hospitals service group. For many years he served on the Nursing Council and did much to improve the status of nurses in fever hospitals. He played golf and lawn tennis, but his hobby was fishing, in which he had ample opportunity of indulging during his vacations and retirement. He was fond of classical music and operas and was a voracious reader but had no liking for novels.

In 1893 Dr. Goodall married Kate Ellen Mackenzie. He had two sons, one of whom was killed in the war, and two daughters, who with their mother and brother survive him.

GRACE STEPHENS

L.M.S. MADRAS

Dr. Grace Stephens, who died in her seventy-eighth year on Dec. 18, was one of the most unassuming of the early medical women of India, and possibly the last of those pioneers. She was the daughter of John Pierre Schmidt and married Daniel Freize Stephens of the Indian public works department. Left a widow with four children she began to study medicine at the Madras Medical College, qualifying in 1888, and four years later came into happy association with Sir Arthur (then Major) Branfoot, afterwards director-general of the Indian Medical Service. Even in those days the native states, ever in the van of progress, were eager to encourage the practice of western medicine in their territories, and the Dowager Maharanee of Gwalior, a woman of charm and character, was anxious to secure the services of a medical woman. Through Sir Aylmer Crofts, the residency surgeon, she approached Sir Arthur Branfoot and in 1895 Dr. Stephens went to Gwalior.



Then began ten years of intense activity. A couple of dispensaries and a small general hospital with wards for men, women, and children had already been opened at Lashkar, the capital city, and Colonel Crofts was busy with plans for a larger hospital and eager to extend the system of dispensaries throughout the state hoping eventually to establish an authoritative medical service there. As his time was largely occupied with these schemes and other matters mainly political, the bulk of the hospital work and almost all the operative work was deputed to Dr. Stephens. There was also much visiting to be done in a zenana city where strict purdah prevailed, and her white wide-brimmed pith hat and high-stepping dog-cart (she always drove a pair of ponies until the motors came) were a familiar sight in its alleys and by-ways, whilst the common folk soon learned to

know her sympathy for the poor and distressed, and others less simple her frank intolerance of cant and humbug which brought her many enemies. It was this latter characteristic that first attracted her to the Dowager Maharanee, who also had little time for sycophants and beggars, and there began a long friendship. Sir James Crofts, Aylmer's brother, was attached to a neighbouring state and deputised for him when he went on furlough. From these great-hearted Irishmen Dr. Stephens learned much of the traditions and purport of Indian India, which was to stand her in good stead when in the next thirty years there she became an integral part of the life of the palace and played a quiet and steadfast rôle in the everyday affairs of the Dowager, whose only son, the Maharajah Scindia, was destined to become the most enlightened ruler that important state so far had known. In 1919 the Dowager died. Her chief anxiety during the last ten years of her life had been the absence of grandchildren. This anxiety eventually was allayed for her son's second marriage was a propitious one: under the supervision of Dr. Stephens two babies were born, the younger of whom was the long-expected heir. Among her possessions Dr. Stephens cherished most the little golden cup containing the sacred honey into which the traditional ruby was dipped and placed on the tongue of the new-born boy by his delighted grandmother.

Dr. Stephens left Gwalior soon after the young Maharajah came of age. She had been present at the death of his grandmother and of his distinguished father, and she had remained to see the young Prince enthroned. She had seen too the realisation of Colonel Crofts's great dream, and she knew and was well pleased that the public health of Gwalior was in safe keeping in the hands of the widespread and instructed state medical service which the late Maharajah Scindia had established.

Dr. ROBERT REID, who died at his home at Whiteabbey on Dec. 22 at the age of 71, was a prominent figure in the life of the district. He was coroner for the Belfast district of co. Antrim and, although he had not been in good health for a year, had still carried on a restricted practice. At one time he served on the rural district council of Belfast. A son of Mr. Robert Reid of Hydepark, Dr. Reid received his education at the Queen's University of Belfast and at the University of Edinburgh. Before taking up practice at Whiteabbey in 1893 he spent two years training in London. In 1931 he was appointed coroner in succession to the late Dr. A. Mussen. Dr. Reid was also a past-president of the British Medical Association and a member of the council of the Ulster Medical Society. He leaves a widow and two daughters.

Major HENRY ALFRED CUMMINS, emeritus professor of botany at University College, Cork, died at Chelsea on Dec. 31 at the age of 74. He was educated at University College, Cork, and qualified in 1885. Soon afterwards he joined the R.A.M.C. and served in the Sikkim expedition of 1888, at Ashanti, and in South Africa, where he was mentioned in dispatches. For his services in South Africa he was awarded the Queen's medal and the C.M.G. He was recalled for service in the late war and was again mentioned in dispatches. In 1894 Major Cummins married Ethel Percy Hall of Cork, and he leaves one son and four daughters.

KING'S COLLEGE HOSPITAL.—The next meeting of the Listerian Society will be held on Jan. 11 at this hospital at 8.30 P.M. when Dr. J. H. Sheldon will give an address.

Medical Diary

Jan. 9 to Jan. 14

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY.

Therapeutics and Pharmacology. 5 P.M., Prof. R. A. Peters, F.R.S., Dr. H. M. Sinclair, Dr. E. A. Carmichael, and Dr. Paul Wood: The Clinical Aspects of the Vitamin-B Complex.

Psychiatry. 8.30 P.M., Dr. Repond (Monthey, Switzerland): Psychology and Psychiatry. Dr. J. A. Hadfield will also speak.

WEDNESDAY.

History of Medicine. 5 P.M., Dr. J. D. Rolleston: F. J. V. Broussais (1772–1838)—His Life and Doctrine. Dr. H. P. Bayon: Allusions to the Circulation in Manuscripts Anterior to the Publication of *De Motu Cordis* 1628.

FRIDAY.

Ophthalmology. 8.30 P.M. (cases at 8 P.M.), Mr. E. C. Zorab (introduced by the president): An Operative Technique for Retinal Detachment. Mr. J. Minton: Prevention of Industrial Eye Injuries. Mr. Minton will also show a film on Protection of Eyes in Industry.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1.

MONDAY.—8 P.M., pathological meeting.

PADDINGTON MEDICAL SOCIETY.

TUESDAY.—9 P.M. (Great Western Royal Hotel, Paddington, W.2), Colonel J. M. Weddel: Surgical Treatment of Air-raid Casualties.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.30 P.M. (De Vere Hotel, Kensington, W.8), Dr. J. D. Rolleston: Some Aspects of Medical Folklore.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.45 P.M. (Miller General Hospital, Greenwich, S.E.10), clinical evening.

SOCIETY FOR THE STUDY OF INEBRIETY.

TUESDAY.—4 P.M. (11, Chandos Street, W.1), Commissioner David Lamb, LL.D.: Inebriety—Some Aspects of the Problem.

BIOCHEMICAL SOCIETY.

FRIDAY.—2.45 P.M. (department of physiology, School of Medicine, Leeds), short communications and demonstrations.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

NATIONAL COUNCIL FOR MENTAL HYGIENE.

THURSDAY.—2.30 P.M. (Central Hall, Westminster, S.W.1), Dr. Lionel Penrose, Mr. Alec Rodger, and Mr. J. H. Nicholson: Is our National Intelligence Declining? 8.30 P.M., Rev. F. E. England and Dr. R. G. Gordon: Should Mental Treatment be Practised Solely by Doctors?

FRIDAY.—10.30 A.M., Dr. W. R. D. Fairbairn and Dr. G. de M. Rudolf: The Psychological Factor in Sexual Delinquency. 3 P.M., Dr. W. J. T. Kimber, Dr. Doris Odlum, and Miss Elizabeth Martland: The Organisation and Staffing of Out-patient Mental Treatment Clinics. 8.30 P.M., Dr. J. R. Rees and Mr. Paul Winterton: Mental Hygiene and the Press.

SATURDAY.—10.30 A.M., Education and the Emotional Needs of the Child. 2.30 P.M., Dr. William Moodie, Dr. Emanuel Miller, and Dr. W. Paterson Brown: Problems of Adolescent Instability and of Juvenile Delinquency. 5.15 P.M., The Place of the Social Worker in Mental Health.

TAVISTOCK CLINIC, Malet Place, W.C.1.

MONDAY.—4.30 P.M., Dr. T. W. Mitchell: Phases of Mental Development.

THURSDAY.—2.30 P.M., Dr. M. B. Wright: War and the Civilian Population. 3.30 P.M., Dr. J. A. Hadfield: General Ætiology and Psychogenesis of the Psychoneuroses. 4.30 P.M., Dr. H. V. Dicks: Anxiety States.

INSTITUTE OF PSYCHO-ANALYSIS, 96, Gloucester Place, W.1.

TUESDAY.—8.30 P.M., Dr. W. H. Gillespie: Somatic Neurosis.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn Road, W.C.1.

FRIDAY.—4 P.M., Mr. A. Lowndes Yates: Nasal Obstruction.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2.

TUESDAY.—5 P.M., Dr. G. B. Dowling: Scleroderma.

THURSDAY.—5 P.M., Dr. W. N. Goldsmith: Pigmentary Disorders. (Chesterfield lectures.)

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh Road, S.W.1.

FRIDAY.—3.30 P.M., Sir William Willcox: Non-articular Rheumatic Affections.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, W.C.1.

THURSDAY.—2 P.M., Mr. H. C. Apperly: Medical Aspects of Dental Caries in Childhood. 3 P.M., Dr. Alan Moncrieff: Some Difficulties in Breast-feeding.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

MONDAY to SATURDAY.—WEST END HOSPITAL FOR NERVOUS DISEASES, in-patient department, Gloucester Gate, N.W.1. Mon. and Fri., 8 P.M., lecture-demonstrations on neurosurgery.—ST. JOHN'S HOSPITAL, 5, Lisle Street, W.C.2, afternoon course in dermatology. (Open to non-members.)

—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland Street, W.1, all-day course in cardiology. (Open to non-members.)

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Infirmary), Dr. David Smith: Vomiting—its Significance and Treatment.

Births, Marriages, and Deaths

BIRTHS

CLEMENTS.—On Jan. 1, at Didsbury, the wife of Dr. A. J. Clements—a son.
EDELSTEN.—On Dec. 26, at Winchester, the wife of Dr. Geoffrey Edelsten—a son.
LLOYD.—On Jan. 1, at Ross-on-Wye, the wife of Dr. G. Marner Lloyd—a daughter.
LLOYD OWEN.—On Dec. 31, the wife of Dr. Morus W. Lloyd Owen—a son.
MCKISSOCK.—On Dec. 26, at Sutherland Avenue, London, W.9, the wife of Mr. Wylie McKissock, F.R.C.S.—a daughter.
MALLINSON.—On Dec. 27, at Twyford, Winchester, the wife of Dr. Hugh Mallinson—a son.
SALMON.—On Dec. 24, at Rickmansworth, the wife of Dr. Harold W. Salmon—a daughter.
STORRS.—On Dec. 29, at Bedford, the wife of Mr. Guy Simonds Storrs, F.R.C.S.—a son.

MARRIAGES

HUTTON—HOWARD.—On Dec. 13, at Mombasa Cathedral, Philip W. Hutton, M.B. Camb., to Katherine E. Howard.
SHARP—COURTIER-DUTTON.—On Dec. 29, at St. Olaf's, Poughill, Edward Sharp, M.B. Camb., to Elise Courtier-Dutton.
SPOONER—REED.—On Dec. 29, at St. Michael's, Highgate, William Henry Casswell Spooner, M.B. Lond., to Ailie Pyemont Reed.

DEATHS

BARNETT.—On Dec. 27, at Church Stretton, Shropshire, Horatio Barnett, M.B. Camb., aged 76.
BIRCH.—On Jan. 2, at Ealing, Henry Priestley Birch, M.R.C.S., Lt.-Col., R.A.M.C. (retd.), aged 79.
GOODALL.—On Dec. 29, at a London nursing-home, Edward Wilberforce Goodall, O.B.E., M.D. Lond.
KASTELIAN.—On Dec. 29, Julian Kastelian, M.B. Lond., of Manor Road, N.16.
SELLWOOD.—On Dec. 28, at Basingstoke Hospital, George Binford Sellwood, M.R.C.S., of Cullompton, Devon, aged 47.
THOMSON.—On Dec. 29, at a nursing-home in London, Thomas Mather Thomson, M.R.C.P.I., of Ennismore Gardens, S.W.7.
WALKER WOOD.—On Dec. 30, John Walker Wood, L.R.C.P.E., of Tunbridge Wells, aged 58.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Appointments

BULCOCK, H. R., L.D.S., dental surgeon to Calderstones Institution and to Brockhall Institution, Langho.
DEEM, HELEN, M.D. N.Zealand, D.R.C.O.G., medical adviser to the dominion council of the Royal New Zealand Society for the Health of Women and Children.
DICKSON, F., M.B. Glasg., assistant resident medical officer at Birmingham Infirmary.
ERNST, M. GWENDOLINE, M.R.C.S., assistant medical officer at the Warneford Hospital, Oxford.
HEANLEY, C. L., M.B. Camb., M.R.C.P., F.R.C.S., surgeon to the Worthing Hospital.
HIGHET, W. B., M.B. N.Zealand, F.R.C.S., resident surgical officer at the Princess Beatrice Hospital, London.
*KEEVIL, NORA L., M.B. Lond., resident assistant obstetric officer at Crumpsall Hospital, Manchester.
KENNEDY, R. S., M.B. Glasg., D.P.M., medical superintendent at Wadsley Mental Hospital, near Sheffield.
LEEDHAM-GREEN, J. C., B.M. Oxfd, F.R.C.S., resident surgical officer at the Birmingham General Hospital.
LEWSEN, S. C., M.R.C.P., assistant physician in the medical department of the Institute of Child Psychology, London.
MANNING, G. B., B.Sc., M.B. Lpool, A.I.C., assistant pathologist at the Royal Infirmary, Bolton.
MUIR, A. J., M.B. Glasg., B.Hy. Durh., D.P.H., assistant medical officer of health for Ealing.
NEAL, J. B., M.R.C.S., junior pathologist at the Devonport pathological laboratory, Dreadnought Hospital, Greenwich.
PLATTS, W. M., M.B. N.Zealand, resident medical officer at the Royal Masonic Hospital, London.
SHEA, J. R. J., L.R.C.P.I., junior assistant medical officer at the West Ham Hospital for Nervous and Mental Disorders.
SORSBY, ARNOLD, M.D. Leeds, F.R.C.S., ophthalmic surgeon to in-patients at the Hampstead General and North-West London Hospital.
SWANN, W. G., M.D. Belf., D.P.H., D.R.C.O.G., assistant medical officer of health and school medical officer for Heston and Isleworth.
WATTIE, ANNIE K., M.B. Aberd., D.P.H., assistant school medical officer (junior) for South Shields.
WESTWOOD, L. A., M.B. Leeds, resident medical officer at the London Chest Hospital.

* Subject to confirmation.

London County Council.—The following appointments are announced. A.M.O. (I) or (II) = assistant medical officer (class I) or (class II):—
RUDD, T. N., M.D. Lond., M.R.C.P., A.M.O. (II), Western;
CUTHBERT, FLORENCE E., M.B. Edin., A.M.O. (II), Queen Mary's, Carshalton;
MACKAY, J. F., M.B. Aberd., A.M.O. (II), St. Matthew's;
DANIELS, MARC, M.D. Paris, L.R.C.P.E., junior A.M.O., North-Western;
THOMSON, C. S., M.B. Belf., junior A.M.O., Park;
WILLIAMS, N. V., M.B. Edin., junior A.M.O., North-Eastern;
VERNON, H. K., M.B. Durh., F.R.C.S., senior A.M.O. (II), St. Peter's;
CLARKE, A. R., M.B. Lond., F.R.C.S., A.M.O. (I), Mile End;
BATEMAN, LAURA L., M.B. Belf., D.P.H., A.M.O. (I) North-Western; and
DOLPHIN, ALPHONSUS, M.B. Dubl., A.M.O. (II) Grove.

Royal Free Hospital.—The following appointments are announced:—
GORDON, M., F.R.C.S., D.L.O., registrar to the ear, nose, and throat department;
QVIST, GEORGE, M.B. Lond., F.R.C.S., surgical registrar;
BALL, MARGARET, M.B. Camb., medical registrar;
COBBE, AILEEN, M.B. Lond., D.R.C.O.G., gynæcological registrar; and
CALTHROP, G. T., M.D. Camb., D.M.R.E., hon. assistant radiologist.

Durham County Council.—The following appointments are announced:—
JOHNSON, J. F. E., M.B. Manc., district tuberculosis medical officer;
HEGARTY, MARY E., M.B. Belf., assistant welfare medical officer; and
WALKER, JOHN, M.B. Glasg., D.P.H., deputy county medical officer of health.

Examining Surgeons under the Factories Act, 1937: Dr. G. M. KAY (Lancaster District, Lancaster); Dr. J. A. MCCLINTOCK (Church Stretton District, Shropshire); Dr. C. W. THOMAS (Pangbourne District, Berkshire); Dr. J. D. GREEN (Bournemouth District, Southampton); Dr. W. F. MUNRO, M.C. (Burnley South District, Lancaster).

Vacancies

For further information refer to the advertisement columns

Altrincham, Cheshire, St. Anne's Home.—Res. surg. O., £200.
Banbury, Oxon., Horton General Hosp.—Res. M.O., at rate of £150.
Barbados General Hosp.—H.S. and anæsthetist, £450.
Barking Hosp.—Res. M.O., £350.
*Battersea General Hosp., S.W.*11.—Res. H.S., at rate of £130.
Birmingham, Children's Hosp.—Receiving-room officer, £250.
Birmingham, Little Bromwich Hosp. for Infectious Diseases.—Jun. res. M.O., £300.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
*Bolingbroke Hosp., Wandsworth Common, S.W.*11.—H.P., at rate of £120.
Bootle General Hosp.—H.P., general H.S., H.S. to spec. depts., and cas. O., each at rate of £150.
Bournemouth County Borough.—Asst. M.O.H., &c., £500.
Bradford, Royal Eye and Ear Hosp.—H.S., £180.
Brighton, New Sussex Hosp. for Women.—H.S., at rate of £100.
Brighton, Royal Sussex County Hosp.—Hon. orthopædic surgeon.
Bristol General Hosp.—Two H.P.'s, Three H.S.'s, res. obstet. O., H.S. to spec. depts., and cas. H.S., each at rate of £80.
Bristol Royal Infirmary.—H.P.'s, H.S.'s, and obstet. H.S.'s, each at rate of £80, except sen. obstet. H.S., £100, and sen. cas. O., £150.
Burnley, Municipal General Hosp.—Jun. res. M.O., £150–£200.
Caernarvonshire and Anglesey Infirmary, Bangor.—Jun. H.S., £120.
Chichester, Royal West Sussex Hosp.—Hon. asst. surgeon. Also second hon. radiologist.
*Connaught Hosp., E.*17.—Hon. physician.
Derbyshire Royal Infirmary.—H.S. for general surgery, £150.
Dewsbury and District General Infirmary.—Sen. H.S. and second H.S., £200 and £150 respectively.
Dover Royal Victoria Hosp.—R.M.O., £140.
Ealing Borough.—Asst. M.O., £450.
*East Ham Memorial Hosp., Shrewsbury Road, E.*7.—Res. M.O., at rate of £200.
Edinburgh Royal College of Physicians.—Bacteriologist, £600.
Exeter City and County.—Asst. M.O.H., £500.
Glasgow Police Department.—Three cas. surgeons, each £600.
Gloucestershire County Council.—Asst. county M.O.H., £600.
Grimsby and District Hosp.—Res. surg. O., at rate of £225. Also H.P. and jun. H.S. and cas. O., each at rate of £150.
Halifax County Borough.—Asst. M.O., &c., £500.
*Hampstead General Hosp., Haverstock Hill, N.W.*3.—H.P. and H.S., each at rate of £100. Also radiologist.
Harrogate Royal Bath Hosp.—Res. M.O., £200.
Hexham, Wooley Sanatorium.—Asst. M.O., £350.
His Majesty's Colonial Medical Service.—Medical officers.
*Hosp. for Sick Children, Great Ormond Street, W.C.*1.—Morbid anatomist and Sebag-Montefiore research fellow, £600. Also out-patient surg. asst., £50.
Huddersfield Royal Infirmary.—Cas. O., at rate of £200. Also H.S. and H.P., each at rate of £150.
Hull, Anlaby Road Institution.—Asst. M.O., £350.
Ilford Borough.—Asst. dental surgeon, £450.
Ilford, King George Hosp.—Cas. O. and surg. reg., £150.

India, Women's Medical Service.—Vacancies.
*Infants Hosp., Vincent Square, Westminster, S.W.*1.—Res. M.O., £300.
Kent Education Committee.—Dental surgeon, £500.
King Edward Memorial Hosp., Ealing.—Cas. O. and deputy res. M.O., at rate of £225.
Leeds, St. James's Hosp.—Res. M.O., £350.
Leeds, St. Mary's Infirmary, Armley.—Res. M.O., £250.
Leicester Royal Infirmary.—Sen. M.O. for women's V.D. clinics, £350.
Lincoln, The Lawn.—Asst. M.O., £300.
London County Council.—Asst. M.O., £750.
*London Hosp., E.*1.—Clin. asst. to X ray dept., £100.
*London Jewish Hosp., Stepney Green, E.*1.—Hon. clin. asst.
*Maida Vale Hosp. for Nervous Diseases, W.*9.—H.P., at rate of £100.*
Maidstone, West Kent General Hosp.—H.P., £175.
Manchester Royal Infirmary.—Res. jun. M.O. for Barnes Convalescent Hosp. and med. reg. to out-patient dept., each at rate of £150. Also H.P.'s and H.S.'s to spec. depts., each at rate of £50.
Middlesbrough, North Riding Infirmary.—Third H.S. and H.P., at rate of £140.
*Middlesex Hosp., London, W.*1.—Research fellowship in physiotherapy, £250.
Morpeth, St. George's Mental Hosp.—Res. asst. M.O., £500.
*National Temperance Hosp., Hampstead Road, N.W.*1.—H.P., at rate of £100.
Northamptonshire County Council.—Asst. county M.O. and district M.O.H., £800.
*Paddington Green Children's Hosp., W.*2.—Hon. physician to skin dept.
Plymouth, Prince of Wales's Hosp., Greenbank Road.—H.P. and H.S., each at rate of £120.
Preston, Sharoe Green Hosp.—Jun. asst. res. M.O., at rate of £100.
*Princess Elizabeth of York Hosp. for Children, Shadwell, E.*1.—H.P., at rate of £125.
Rochdale Infirmary and Dispensary.—Sen. H.S., £250.
Royal Air Force.—Commissions.
*Royal College of Physicians, Pall Mall East, S.W.*1.—Leverhulme research scholarship, £500. Also Streatfeild research scholarship in medicine and surgery, £250.
*Royal London Ophthalmic Hosp., City Road, E.C.*1.—Gifford Edmonds prize in ophthalmology, £100.
Royal Naval Dental Service.—Dental officers.
Royal Naval Medical Service.—M.O.'s.
*Royal Surgical Aid Society, Salisbury Square, E.C.*4.—Jun. surgeon, 100 guineas.
*St. John Clinic and Institute of Physical Medicine, Ranelagh Road, S.W.*1.—Hon. consultant radiologist.
*St. John's Hosp. for Diseases of the Skin, 5, Lisle Street, Leicester Square, W.C.*2.—Hon. asst. physician.
*St. Thomas's Hosp., S.E.*1.—Surg. reg. and tutor, £250.
Salisbury General Infirmary.—Res. M.O., £250. Also H.P., at rate of £125.
Southall Borough.—Asst. M.O.H., £600.
Stroud Urban and Rural Districts and Nailsworth Urban District. M.O.H. and school medical inspector, £800.
Sunderland Children's Hosp.—H.P. and H.S., each at rate of £120.
Swansea General and Eye Hosp.—Locum H.S. to E.N.T. and ophth. depts., 5 guineas per week.
Taunton and Somerset Hosp.—Hon. visiting radiologist.
University of London.—Readership in biochemistry at Guy's Hosp. med. sch., £500.
*Victoria Hosp. for Children, Tite Street, Chelsea, S.W.*3.—H.P. and H.S., each at rate of £100.
West Riding of Yorkshire County Council.—Asst. M.O.H., &c., for Adwick-le-Street, &c., U.D.C.'s, £800.
Weston-super-Mare Hosp.—Res. H.P., £150.
Wickford, Runwell Hosp. for Nervous and Mental Disorders.—H.P., at rate of £150.
Willesden Corporation.—Asst. M.O., £600.
Wolverhampton, Royal Hosp.—Res. anæsthetist and asst. res. M.O. for gynæcological and obstet. depts., at £200 and £100 respectively.
*Woolwich and District War Memorial Hosp., Shooters Hill, S.E.*18. Hon. anæsthetist.

MEDICAL NEWS

University of London

At recent examinations the following candidates were successful :—

D.P.H.

Part I.—T. K. Abbott, Lily Bennett, Margaret Brodigan, H. B. C. Carter-Locke, John Clark, Eva M. Cran, Marc Daniels, C. S. Davies, D. O. Dickie, Jean Duncan Whyte, R. W. Elliott, C. N. Faith, Margaret A. B. Fleming, Christina A. Gunn, E. C. H. Huddy, J. H. Lawrence, H. A. Leggett, V. N. Leyshon, F. D. M. Livingstone, Jean J. Macdonald, J. P. McGladdery, R. W. Markham, Isobel M. S. Marshall, E. L. M. Millar, Anil Mukerji, Dorothea M. Norman-Jones, M. N. Pai, J. W. Parks, Peter Pau, G. H. Shaw, M. M. Sircar, G. R. Taylor, C. S. Thomson, N. V. Williams, R. C. Wofinden, Grace E. Woods, and Rowena Woolf.

University of Wales

At recent examinations the following candidates were successful :—

D.P.H.

Part I.—Beryl Badham, R. T. Bevan, D. J. Davies, C. T. Jones, H. R. Stubbins, and A. J. Thomas.

Royal College of Physicians of London

Particulars of the following scholarships, which will shortly be awarded, will be found in our advertisement columns :—

The Leverhulme research scholarship, of an annual value of £500, will be awarded to a British subject of not less than 25 years of age who wishes to investigate some problem of disease in any branch of medicine. The work must have as its base some established institution, preferably in the United Kingdom, and preference will be given to applicants holding a medical qualification.

The *Streatfeild research scholarship* was founded for the promotion of research in medicine and surgery. It may be held for three years and the emolument will probably be £250 per annum.

Applications for both these scholarships should reach the assistant registrar of the college, Pall Mall East, London, S.W.1, not later than Monday, Jan. 23.

Royal College of Surgeons of England

On Jan. 16, Mr. Cecil Joll will give the first of a series of Hunterian lectures which will be held at the college at 5 P.M. on Mondays, Wednesdays, and Fridays till Feb. 10. He will speak on the pathology, diagnosis, and treatment of Hashimoto's disease (struma lymphomatosa). The other lecturers are as follows : Jan. 18, Prof. J. Paterson Ross, the effects of radium on carcinoma of the breast ; Jan. 20, Mr. A. J. Gardham, classification of new growths of the mouth in relation to treatment and prognosis ; Jan. 27, Mr. E. W. Riches, hydronephrosis—the results of conservative treatment ; Jan. 30, Mr. H. T. Simmons, relapse following sympathectomy ; Feb. 1, Mr. A. L. d'Abreu, congenital cysts of the lung and pleura ; Feb. 6, Mr. F. J. Sambrook Gowar, the post-operative complications of pulmonary lobectomy ; Feb. 8, Mr. Ronald Edwards, experimental pneumonectomy and the development of a two-stage operation for the removal of a whole lung ; and Feb. 10, Mr. J. H. Mulvany, a differentiation in the mechanism, symptomatology, pathology, and treatment of two types of exophthalmos occurring in association with thyrotoxicosis.

At 4 P.M. on Tuesday, Feb. 14, Mr. W. Sampson Handley will deliver the Hunterian oration.

* The closing date for applications is Jan. 11. The date was given incorrectly last week.

Tavistock Clinic

The Lent term of the clinical course of training, open to all registered medical practitioners, which is being held at this clinic will be open on Jan. 12. Lectures will be given on Mondays and Thursdays at 4.30 P.M. till March 20. Further particulars may be had from the educational secretary of the clinic, Malet Place, London, W.C.1.

Institute of British Surgical Technicians

Mr. T. Holmes Sellors will give a lecture on chest surgery which will be illustrated by a coloured film, on Friday, Jan. 20, at 8.15 P.M., at the Welbeck Hotel, Welbeck Street, London, W.1. Members of the medical profession are invited to apply for tickets to the secretary of the institute, 6, Holborn Viaduct, E.C.1.

British Institute of Philosophy

An address on the present relations of science and religion will be given at this institute by Prof. C. D. Broad, Litt. D., at University College, Gower Street, London, W.C.1, at 8.15 P.M., on Tuesday, Jan. 17. Applications for tickets should be made to the director of studies at University Hall, Gordon Square, London, W.C.1.

Hospital for Sick Children, Great Ormond Street

Applications are invited from registered medical practitioners trained in pathological anatomy and histology for a whole-time appointment as morbid anatomist and Sebag-Montefiore research fellow at this hospital. Further particulars will be found in our advertisement columns. —The managers of this hospital have had to close their country branch at Tadworth where many children have been sent for convalescence. It cannot be reopened till the hospital is able to allocate £10,000 yearly for its maintenance.

Naval Appointments

The Admiralty announces that the following have received appointment as surgeon-lieutenants, R.N., for short service :—

J. O. Fielding, M.R.C.S., N. A. Freebairn, M.B. Glasg., J. T. Hayward-Butt, M.R.C.S., D.A., J. E. Price, L.R.C.P.E., and L. G. Topham, M.B. Leeds.

Paddington Medical Society

A meeting of this society will be held at 9 P.M. on Tuesday, Jan. 10, at the Great Western Royal Hotel, Paddington, W.2, when Colonel J. M. Weddel will speak on the surgical treatment of air-raid casualties. Medical members of the A.R.P. staff of the Ministry of Health will take part in the discussion, and all medical practitioners are invited to attend the meeting.

Deutsche Gesellschaft für Kreislaufforschung

This society will hold its twelfth congress at Bad Nauheim on March 25 and 26 under the presidency of Prof. E. Edens (Düsseldorf). The principal subjects for discussion will be electrocardiography and cardiac insufficiency. An address on experimental hypertension will also be delivered by Prof. E. V. Allen of the Mayo Clinic. Further information may be had from Prof. Eb. Koch, Kerckhoff Institut, Bad Nauheim, Germany.

Nursing Services in an Emergency

The members of the Central Emergency Committee for the Nursing Profession, appointed by the Minister of Health to compile a register of nurses and nursing auxiliaries available for service in a national emergency, are Sir Malcolm Delevingne (chairman), Dame Ellen Musson, R.R.C. (General Nursing Council), Sir Comyns Berkeley, F.R.C.O.G. (Central Midwives Board), Miss D. S. Coode (College of Nursing), Dame Beryl Oliver, R.R.C. (British Red Cross Society), Lady Perrott, R.R.C. (Order of St. John), the Dowager Marchioness of Reading (Women's Voluntary Services for Civil Defence), Dr. G. C. Anderson (British Medical Association), Sir Frederick Menzies, F.R.C.P. (London County Council), Mr. E. W. Cemlyn-Jones (County Councils Association), Alderman W. E. Wilford (Association of Municipal Corporations), Dr. James Ferguson (Society of Medical Officers of Health), Mr. W. H. Harper (British Hospitals Association), Miss B. M. Martin, R.R.C. (Admiralty), Miss C. M. Roy, R.R.C. (War Office), Miss E. M. Blair, R.R.C. (Air Ministry), Colonel A. W. Moore, M.B. (Ministry of Pensions), Mr. H. N. de Villiers (Ministry of Labour), Dr. N. W. Hammer (Home Office A.R.P. Department), and Miss Z. L. Puxley (Ministry of Health) who will also act as secretary of the committee

A similar committee is being set up by the Secretary of State for Scotland under the chairmanship of Sir John Jeffrey and the medical members will include : Lady Ruth Balfour, Dr. A. S. M. Macgregor, Dr. W. G. Clark, Dr. J. D. Comrie, Colonel D. J. Mackintosh, Colonel G. H. Edington, Dr. N. W. Hammer, and Dr. J. M. Mackintosh.

Pharmaceutical Society of Great Britain

A meeting of this society will be held on Tuesday, Jan. 10, at 17, Bloomsbury Square, London, W.C.1, when Prof. J. H. Gaddum will speak on recent discoveries about animal hormones.

Research in Physiotherapy

Applications are invited in our advertisement columns this week for a research fellowship in physiotherapy to be held at the Middlesex Hospital under the direction of the head of the department of physiotherapy, Dr. F. D. Howitt, and the professor of physiology, Prof. Samson Wright. The initial salary is £250, but more may be offered to candidates with suitable qualifications.

National Institute of Industrial Psychology

A public luncheon organised by the institute will be held on Thursday, Jan. 19, at Princes Restaurant, Piccadilly, London, W.1, at 1.10 P.M., at which Dr. J. R. Rees, medical director of the Tavistock Clinic, will speak on the progress of medical psychology. A demonstration of the institute's psychological methods of vocational guidance, to which guests are invited, will be held at the institute following the luncheon at 3 P.M. Tickets may be had from the institute, Aldwych House, Aldwych, W.C.2, and guests should indicate whether they wish to attend the demonstration.

NOTES, COMMENTS, AND ABSTRACTS

THE TUBERCULIN REACTION AS A MEASURE OF ANTI-TUBERCULOSIS ACTIVITIES

WHEN Naegeli, Burckhardt, Hamburger, and others published, a generation ago, their disquieting findings on the high frequency of infections with tuberculosis, as indicated by tuberculin testing, the prophylactic implications of their work were not at once clear. Now the tuberculin test has begun to be used in Sweden as a measure of the efficacy of anti-tuberculosis work in a given area. Dr. Nicolai Johannsen has given an account of a ten-year study in Gothenburg of tuberculin reactions in an institution or "home" to which healthy children were admitted between the ages of one and fifteen years (*Nord. med. Tidskr.* Oct. 15, 1938, p. 1629). From the beginning of 1928 till the end of 1937 tuberculin tests were applied to 3373 of these children who were first tested with tuberculin, rubbed into the skin over the sternum, and then if no reaction occurred with a second percutaneous test. If this also proved negative an intracutaneous injection of 0·1 c.cm. of a 1 in 100 dilution of Merck's diagnostic tuberculin, obtained from both human and bovine strains, was given. As was to be expected, the frequency of the positive reactions rose gradually with the age of the children tested. At the age of three only 10 per cent. gave positive reactions. At the age of seven the percentage of positive reactors had risen to about 30, and at the age of fourteen to fifteen to about 50. These findings are in conformity with those of other Scandinavian observers in recent times, but what is singularly striking in Dr. Johannsen's study is his comparison of the first with the last year of tuberculin testing. In 1928 as high a proportion as 28·2 per cent. of all the children tested gave positive reactions; ten years later this figure was reduced to 12·4 per cent. During these ten years an intensive tuberculosis dispensary campaign was conducted in Gothenburg, and Dr. Johannsen suggests that this dramatic decline in the frequency of positive tuberculin reactions in healthy children of all ages may well be attributable to the success of this campaign. A control series in another less progressive district would be necessary before the evidence could be regarded as convincing. And even then if, as Heimbeck and others suspect, young adults in some cases tolerate a primary infection with tuberculosis less well than children, what is gained by putting off the evil day? While many such questions still await answers, Dr. Johannsen's demonstration of a rapidly declining latent tuberculosis-infection rate must be greeted with satisfaction as probably indicating that the number of open cases of tuberculosis had been much reduced in the community studied.

"A NEW CIRCULATORY STIMULANT"

WE lately called the attention of readers to a synthetic amine, isomeric with ephedrine, recently studied in Germany for its pressor effects and placed on the market there under the name of Veritol (Knoll). In citing the experience of a number of German clinicians we remarked that Dr. Mamier, assistant in Prof. Frank's children's clinic at Mannheim, had used veritol with success for bronchopneumonia in children, giving it by mouth alternately with Cardiazol. We added that in his article Mamier warned practitioners against the simultaneous use of veritol and cardiazol. This statement we regret was based on a misreading of the German text. Actually Mamier wrote : "Also the simultaneous use of these two circulatory remedies would seem to be valuable."

We have reason to think that this opinion is not shared by those who are working with these drugs in this country, but it is proper for us to emphasise that their doubts are not confirmed by the Mannheim experience.

PSYCHIATRY TAKES THE FIELD IN SPAIN

THE politically moderate may see little difference in the extremists on each side of them; and it is easy to recall the names of leaders who were once conspicuous in the opposite camp. In the heat of the struggle, however, it is but natural to describe the enemy as altogether different and debased, and in General Franco's Spain the psychiatrist has been enlisted to give verisimilitude to this allegation. Writing in the *Semana Médica Española* for Oct. 8, 1938 (p. 172) A. V. Nágera expresses the opinion that a certain biopsychic type is associated with a constitutional predisposition to accept the views of Karl Marx, and he claims that there are consequently many Marxist fanatics among persons of low intelligence and many antisocial psychopaths among Marxists. He holds that the cyclothymic extravert tends to political opportunism, adapting himself to shifting circumstances, whereas the schizothymic introvert tends to sentimentalism, idealism, and fanaticism. He expected therefore to find a schizothymic temperament in those communists who had borne arms and a cyclothymic temperament in those who had acted as agents and propagandists. The material which he studied included (1) "international"—i.e., South American—prisoners of war in concentration camps; (2) men and women arrested for Marxist political activities; (3) Basque separatists, in whom, he claims, is often seen the curious phenomenon of combined political and religious fanaticism, doubly curious because they are fighting in alliance with the enemies of their religion; and (4) Catalonian separatists in whom Marxism is combined with anti-Spanish hatred. With E. C. Gargollo and A. del Rio he gives details (p. 177) of physique, temperament, intelligence, education, culture, economic status, political and religious ideas and training, social personality, motives for enlisting, patriotic ideas, professional, social, and sexual failures, occupation, and sexual life of 78 South American prisoners. The investigators draw many uncomplimentary conclusions about the mentality and habits of their enemies, but they cannot be considered impartial guides to the state of mind of Republican Spain.

ADAM STREET, ADELPHI, JANUARY, 1939

Until the east side of the street is rebuilt visitors to Number Seven may enjoy an unexpected vista southwards across the Thames, with Cleopatra's Needle (brought to London in 1879 by Sir Erasmus Wilson, M.D.) on the cis-fluvian side and the Waterloo Shot Tower (Watts 1789) on the other.

NEW PREPARATIONS

DICHLORO-INDOPHENOL TABLETS B.D.H. are intended to enable practitioners, with little equipment, to determine the amount of ascorbic acid (vitamin C) in urine. A low excretion of this substance after a test dose is held to suggest that the patient's tissues are "unsaturated" and that his diet may have been deficient in the vitamin; similarly a low excretion on the ordinary diet suggests that the diet or its absorption is inadequate. A rapid method of test and a more elaborate quantitative method can both be carried out with these tablets, which are obtainable, with instructions for use, from the British Drug Houses Ltd., Graham Street, City Road, London, N.1.

EPANUTIN. — Sodium diphenyl hydantoinate (Dilantin) is sold in this country by Parke, Davis and Co. (Beak Street, W.1) under the name Epanutin. It is said to have an anti-convulsant action in epilepsy but to have relatively little hypnotic effect. Clinical results obtained with it by Merritt and Putnam of Harvard were reviewed in our issue of Oct. 22 (p. 956), and letters on the use of the drug appeared on Nov. 5 and Dec. 31. The correspondence is continued in our present issue.

NICOTINIC ACID TABLETS A. AND H. each contain 50 mg. of nicotinic acid. A leading article on the use of this substance in the prevention and treatment of pellagra will be found in THE LANCET of Dec. 24. They are made by Allen and Hanburys Ltd., Bethnal Green, E.2.

Ciba Handbooks Nos. 2 and 3, obtainable from CIBA LTD. (40, Southwark Street, S.E.1) in paper-covered and library editions, review the use of Percaine and of Ciba Hypnotics and Analgesics. No. 2, after setting out the special advantages of Percaine, gives precise particulars of its application in clinical practice, including the induction of spinal anæsthesia by various techniques. No. 3 is devoted chiefly to the merits of Dial and its combinations.

Messrs. J. C. ENO (Pomeroy Street, S.E.14) announce that they are now the exclusive suppliers of Stabilized Calcium Acetylsalicylate, formerly sold by Genatosan Ltd. as Stabilized Calcium Aspirin.

The Medical Diary and Therapeutic Index for 1939 prepared by Messrs. Bayer is issued in many different languages, and this year contains even fuller information about the preparations and methods described, both old and new. The leather-covered English edition issued by BAYER PRODUCTS LTD. (Africa House, Kingsway, W.C.2) is well adapted to the needs of practitioners in this country, and though a page is provided for every day of the year the book remains thin because the diary itself is issued in four quarters, only one of which need be inserted at a time.

FOR DOG-LOVERS.—Among the three million dog-owners in this country there must be many doctors who will appreciate "Who has a Dog?" (Chapman and Hall, pp. 187, 7*s.* 6*d.*), a book of short stories about dogs written by Sir Reginald St. Johnstone, a distinguished doctor-administrator, and admirably illustrated by Mr. Frank Hart. Sir Reginald has bred, shown, and owned dogs of many kinds; he understands them all: and Mr. Hart knows what they look like.

ABUNDANT provision is now made for the welfare of the child, both before and after it reaches school age, but there is no class of the community which more constantly escapes medical care and supervision than the mother of the working-class family. And there is no one who merits more worthily that care and attention.—J. A. CHARLES. Ann. Rep. of M.O.H. for Newcastle-upon-Tyne for 1937.